

THE EFFECT OF COMPUTER INTERACTIVE SIMULATION ON SITUATIONAL  
DECISION-MAKING AND COMPETENCY DEVELOPMENT OF EXPERIENCED  
STAFF NURSES

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THE EFFECT OF COMPUTER INTERACTIVE SIMULATION ON SITUATIONAL  
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# THE EFFECT OF COMPUTER INTERACTIVE SIMULATION ON SITUATIONAL DECISION-MAKING AND COMPETENCY DEVELOPMENT OF EXPERIENCED STAFF NURSES

## ABSTRACT

Simulation and gaming as learning methodologies are increasing in use. Many institutions, including hospitals, are developing simulation programs as an alternative to or in conjunction with the traditional classroom as an instructional method. Many educators believe that learning preferences have changed and that simulation is more effective and motivating to the new generation of learners. The purpose of this study was to test whether computer interactional simulation is more effective as an instructional methodology than the traditional classroom setting in promoting clinical competency in experienced staff nurses. This study was designed to evaluate the effects of simulation on knowledge development and improved situational understanding/critical thinking (decision-making skills) related to the safe management of patients requiring restraints.

In this study, nurses with a minimum of one year of experience were randomly selected to participate. Subjects who agreed to participate were randomly assigned to either a control group (traditional classroom, n=11) or the treatment group (simulation, n=21). A literature review was conducted to develop operational definitions and determine the clinical applicability of electronic simulation as an instructional methodology for developing competency in nursing practice.

Group differences were analyzed using analysis of covariance (ANCOVA) in a pretest-posttest design that included a demographics instrument. Analysis of the demographics of both groups showed no differences. ANCOVA results showed no significant

differences in overall competency development or critical thinking between the two groups. Knowledge scores for the traditional classroom group were significantly higher than the treatment group. Although the literature revealed that simulation and gaming has been used widely in many technical and professional settings to promote situational understanding/critical thinking skills and to increase knowledge, this study raises the question as to whether simulation and gaming is any more effective in competency development in experienced staff nurses than the traditional classroom instruction.



## DEDICATION

This composition is dedicated in loving memory to my father John Leslie Bashor. Thank you for supporting my goals and for encouraging me to value hard work and persistence.

To my loving husband Pete, mother Lucille, and family who have supported and encouraged me throughout this journey.

And all the wonderful nurses who daily touch the lives of the sick and most vulnerable, may this work assist you in some way to enhance your clinical practice. Thank you for your devotion and dedication to patients and their families.

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# CHAPTER I

## RESEARCH PROBLEM

*"Tell me, and I'll forget.  
Show me, and I'll remember.  
Involve me, and I'll learn."  
-- Marla Jones*

The profession of nursing in the United States is in a position to impact healthcare and the outcomes of patient care in a way never seen before in nursing's history. A transformation of nursing practice is occurring due to the profound changes in technology, science, and focus on safety and cost containment. Healthcare has become more and more complex especially in acute care settings. The focus of this study was to determine which teaching strategies are most effective in enhancing competency in safe nursing practice by increasing critical thinking skills/situational understanding and knowledge in the context of such complexity. The goal of healthcare organizations and teaching institutions is to support novice and experienced staff nurses in applications of their human caring and intellectual capital through evidence based decision-making in real-care situations (Ebright, Kookan, Moody, & Al-Ishaq, 2006).

The challenge of today's educators is to determine what will comprise best practices in nursing education to support students' knowledge regarding patient safety in complex health care systems (Ebright et al., 2006). Decision-making influences safety, consciousness, and care giving. According to Ebright et al. (2006), there is a difference between knowing what care needs to be done and knowing how to deliver care in terms of work complexity and patient safety. Teaching how to deliver care safely in a complex environment requires an emphasis on new knowledge and skill development. Using



critical thinking skills, for example, is increasingly being recognized as the cognitive ability to judiciously draw from acquired knowledge in formulating, evaluating, and if appropriate, re-evaluating clinical judgment (Facione & Facione, 1996). Critical thinking results from interpretation, analysis, evaluation, and conceptual understanding of data (Facione & Facione, 1996). Teaching nurses how to process data from virtual patient case studies is thought to enhance critical thinking skills and support patient safety (Warren, Connors, & Weaver, 2002).

Simulation has been defined as a collection of tools and methodologies that, when applied as a system model, behave in the same way as a system under study (McRoberts, 2005). Computer-based simulations and media used for education, such as interactive courseware and computer game simulations, make use of a variety of technologies and instructional strategies to augment existing methods (Prevou, 2006). By making changes in the simulation model, nurses can test proposed scenarios in situations that mimic real-life clinical settings. Simulations provide a motivating learning environment that promotes the accomplishment of established learning objectives while facilitating knowledge acquisition (Prevou, 2006). In 2005, Pauli described a gaming strategy that promotes learning, self-efficacy, and assesses staff competency using a cooperative and interactive learning approach. When nurses are motivated and feel competent as clinicians, their practice is more likely to change and reflect the intended learning goal (Pauli, 2005).

### **Definitions of Variables**

Situational understanding, critical thinking, clinical reasoning, decision-making, and clinical judgment:

For purposes of this study, these terms are used interchangeably to mean the cognitive ability to judiciously draw from previous knowledge to formulate sound clinical judgments and decisions based on careful analysis of the situation, evaluation, intuition, and wisdom. Critical thinking provides the mechanism for converting knowledge, facts and information into practical application in the real clinical world (Schon, 1983, as cited in Rubenfeld & Scheffer, 2010).

Knowledge:

For purposes of this study, knowledge was defined as a familiarity, awareness, and understanding of information and facts related to the care of patients in physical restraints as evidenced by the participants' ability to answer factual questions about restraint care.

Competency:

For purposes of this study, competency was defined as proficiency in clinical decision-making by using critical thinking skills to convert knowledge, facts, and information in clinical care situations.

Electronic interactive simulations of real-life clinical scenarios:

For purposes of this study, electronic interactive simulations of real-life clinical scenarios were simulated scenarios of patient care situations related to the care of patients in physical restraints that were typical in real-life acute care clinical settings. The interactive aspect refers to the action taken by the participant during the educational session on the computer. Participant interaction, in this study, involved clicking to open the clinical scenarios as requested and responding to related questions as to best practice.

Immediate feedback was provided and participants were allowed to explore other answers.

#### Traditional Classroom Instruction:

For purposes of this study, traditional classroom instruction was defined as a traditional teacher-centered method of instruction in a classroom. The instructor lectured to participants in front of the classroom using a power-point presentation.

This study examined the effect of two teaching strategies on knowledge, situational understanding/critical thinking skills (decision making), and competency development. Two variations of the independent variable, instructional methodology, were studied; traditional classroom instruction and decision-making simulation.

Decision-Making Simulation (DMS) consisted of a computer based simulation of real-life clinical scenarios that were interactive with the user. The electronic simulation was compared with the traditional non electronic classroom instruction currently in place as part of the hospitals' continuing education programs.

The dependent variables were knowledge, situational understanding/critical thinking skills (decision making), and clinical competency regarding one dimension of the National Patient Safety Goals (The Joint Commission), patient restraint and fall prevention. Since the primary rationale for restraint use is fall prevention, course content included hospital policies and procedures, federal and state regulations, and evidence based nursing practice related to restraint use and fall prevention. Fall prevention was defined as those competencies related to fall risk assessments on hospitalized patients, appropriate communication regarding high risk patients to other members of the health

care team, appropriate action to prevent patient falls, and the appropriate selection and use of restraint equipment.

Questions on the pretest and posttest reflected understanding of the theoretical concepts of patient safety, rationale for safe practices, current practice behaviors, and motivation to comply and bring practice into compliance with relevant regulations. The pretest and posttest included questions that test knowledge of the National Patient Safety Goals, and, to some extent, current organizational policies and procedures related to patient safety.

The computer simulation and the classroom instruction were scenario-based and focused on “desired actions.” Subjects were evaluated as to their ability to perform in a given context and their capacity to transfer knowledge and skills to new tasks and situations (Brunt, 2002). The desired actions reflected decisions based on appropriate situational understanding and critical thinking, thus, reflecting a level of proficiency and competence. “Competence assessment is systematic and allows for measurable assessment of the person’s ability to perform required activities” (Joint Commission Resources, 2006, p. 21). Brunt (2002) stated that “Competency focuses on learning outcomes. It is about what people can do” (p. 314). The definition of Critical Thinking Skills (CTS) is consistent with the following definition (1990 APA Consensus Definition) outlined in Facione and Facione (1996):

#### Consensus Critical Thinking Cognitive Skills and Sub-Skills

Interpretation:	Categorization Decoding Sentences Clarifying Meaning
Analysis	Examining Ideas Identifying Arguments

	Analyzing Arguments
Evaluation:	Assessing Claims Assessing Arguments
Inference:	Querying Evidence Conjecturing Alternatives Drawing Conclusions
Explanation:	Stating Results Justifying Procedures Presenting Arguments
Self-Regulation:	Self Examination Self Correction (p. 5)

Although the focus of this study was on whether electronic simulation is more effective in promoting competency in nursing practice than traditional classroom instruction, other factors, such as self-efficacy, play a role in whether education results in a change in clinical practice. Self-efficacy is defined by Bandura (1994) as one's belief about one's capabilities to produce designated levels of performance that influence those events that affect one's life. Self-efficacy beliefs determine how one feels, thinks, how one motivates oneself and thus how one behaves. Such beliefs produce outcomes through four major processes: cognitive, motivational, affective, and selection.

The effects of computer-based clinical conferencing on nursing students' self-efficacy were studied by Babenko-Mould and Andrusyszyn (2004). Their findings suggested support that sources of self-efficacy information can influence cognitive self-appraisal of confidence for carrying out specific actions. Classroom simulation was found to be very effective in enhancing self-efficacy related to health teaching in nursing students at the University of Western Ontario (Goldenberg, Andrusyszyn, & Iwasiw, 2005). The results of classroom simulation suggested that there was an increased

perceived confidence in performing health teaching and that the use of simulation as a teaching-learning method should be continued and applied to other learner behaviors. Cioffi, Purcal, and Arundell (2005) also found higher confidence levels (self-efficacy) in the midwifery students who received the two simulation sessions. Other main findings were that students who received the simulation strategy collected more clinical information, revisited collected clinical information less, made fewer formative inferences, and, on the posttest, reached a final decision more quickly. With self-efficacy, individuals assess their skills and their capabilities before translating those skills into action (Schunk, 2000). Personal influences, such as goal setting, information processing, and situational factors (rewards) affect a student's engagement (motivation) for the activity. Motivation then leads to enhanced learning, and eventually self-efficacy and competency (Schunk, 2000).

For purposes of this study, potential for change in practice was defined as the nurses' report that they initiate new behaviors or modify their care of patients as a result of training.

### **Rationale for Study**

Traditional classroom lecture has long been the primary method of providing continuing education in the hospital setting (Brady, Molzen, Graham, & O'Neill, 2006). When hospitals have found it necessary to orient nursing personnel to new knowledge and/or technology, rarely has there been any attention to the variation in learning preferences. Also, little or no follow-up has been done to determine whether new knowledge is actually operationalized at the bedside. The resistance to change and the

reasons why nurses do not tend to modify their practice in response to new knowledge has been well documented in the literature (MacGuire, 1990).

The Institute of Medicine, The Joint Commission (JCAHO), and others have recommended that patient safety be a high priority of patient care. Compliance with the National Patient Safety Goals (JCAHO) requires a change in nursing practices and the development of critical thinking skills (Facione & Facione, 1996). The goal of this study was to explore the effect of two instructional methodologies on competency development, knowledge acquisition, and critical/thinking skills using quantitative methods. The significance of this study to clinical practice is more than just expanding our understanding of the effectiveness of different instructional modalities. The challenge is motivating experienced staff nurses to modify their professional practice as a result of their learning experiences. Efforts to achieve the best patient care outcomes and safe environments for patients are dependent on nurse competency and the incorporation of the latest evidence-based practices.

### **Hypotheses**

This study was designed to assess whether computer interactional simulations promote knowledge development, improve situational understanding and enhance the critical thinking skills of experienced staff nurses more than the traditional classroom model of instruction. Also, the study explored whether electronic simulation is more effective as an instructional methodology in promoting overall clinical competency than traditional classroom instruction.

The three hypotheses tested were:

1. Electronic interactive simulations of real-life clinical scenarios are more effective than traditional instruction in increasing staff nurse knowledge and understanding of the nursing care required to provide safe restraint care.
2. Electronic interactive simulations of real-life clinical scenarios are more effective than traditional instruction in improving the situational understanding/critical thinking skills (decision-making skills) of experienced staff nurses in providing safe restraint care.
3. Electronic interactive simulations of real-life clinical scenarios are more effective than traditional instruction in developing overall staff nurse competency related to safe restraint care.

### **Summary**

The national attention to critical thinking has prompted study of the relationships between knowledge development, clinical judgment, various cognitive models of thinking, and competency. Nursing educators and researchers are looking to new instructional strategies such as simulation to discover how critical thinking contributes to safe and effective patient care. The purpose of this study was to add to the growing body of knowledge of instructional strategies and determine if computer interactional simulation contributes to the development of knowledge, situational decision making/critical thinking skills, and competency. Simulation is an attempt to replicate the essential aspects of a clinical situation so that when the situation occurs in the real world, the nurse will apply critical thinking skills and act judiciously (Jeffries, 2007). In some instances, simulation can provide experiences for knowledge development without risk to real patients (Jeffries, 2007).



Testing the hypothesis that computer simulation is more effective than traditional classroom instruction in developing clinical competency contributes to the growing knowledge of computer instruction. The goal of this study was to explore the effectiveness of instructional methods in the acute care setting. It is believed that by enhancing the competency, critical thinking skills, and knowledge of experienced staff nurses, patient care outcomes will be improved.

Continuing education is a critical component to advancing the expertise of staff nurses and motivating them to integrate new knowledge into their clinical practice. Unless nurses are exposed to instructional strategies that increase situational understanding and are meaningful to their day to day practice, data and information are likely to be ignored. Patients ultimately are the beneficiaries of new clinical knowledge and research as long as providers demonstrate judgment and competency in the application of new medical science.

## CHAPTER II

### REVIEW OF LITERATURE

*"Learning without thought is labor lost;  
thought without learning is perilous."*  
- Confucius

The review of related literature is organized as follows: (1) Introduction; (2) Patient Quality and Safety; (3) Simulation and Gaming; (4) Critical Thinking; (5) Competency; (6) Summary of the related literature.

#### **Introduction**

Early in 2011, the Department of Health and Human Services released the *National Strategy for Quality Improvement in Health Care* (U. S. Department of Health and Human Services, 2011). The Strategy, under the Affordable Care Act, was the first effort to create a national agenda to improve the quality of health care in the United States. The Strategy established six priorities, one of which was to make care safer by reducing harm caused in the delivery of care (U. S. Department of Health and Human Services, 2011).

The Institute of Medicine's (IOM's) seminal report, *To Error is Human: Building a Safer Health System* (National Academy of Sciences, 2000), brought national attention to the staggering numbers of Americans that die each year as a result of preventable medical errors. The second IOM Report, *Crossing the Quality Chasm* (National Academy of Sciences, 2001), described the use of internal and external approaches to meaningfully improve the quality of health care. The *Quality Chasm* (National Academy of Sciences, 2001) report described the growing complexity of health care and the rapid

expansion of evidence base underlying practice. A key recommendation of the IOM Reports was employee development by enhancing knowledge, skill level, competency, experience, intelligence, sensory capabilities, training, and education (National Academy of Sciences, 2001).

This study explores the effectiveness of two different instructional methodologies, computer simulation and traditional classroom instruction, in promoting competency by increasing knowledge of best practices in one specific clinical practice, the application and management of patients in physical restraints, and critical thinking skills related to alternatives and safety management of physical restraints. This specific practice has been a concern since The Omnibus Budget Reconciliation Bill (OBRA) of 1997. The OBRA mandated changes to promote patient safety and specifically addressed the dangers of physical restraints in clinical practice. Recent research has led the Joint Commission to set strict standards for the use of physical restraints to protect patients from injury and death (JCAHO, 2011).

### **Patient Quality and Safety**

The attention to patient safety is partly due to the two reports released by the IOM. These reports brought to light the numbers and types of medical errors that have occurred in hospitals throughout the United States. One study reported that approximately 98,000 Americans die each year as a result of medical errors (U. S. Department of Health and Human Services, 2008). The cost of medical errors to the health care system was estimated by the IOM as approximately \$38 billion per year (U. S. Department of Health and Human Services, 2008). It was estimated that

approximately \$17 billion of those costs were associated with preventable errors (U. S. Department of Health and Human Services, 2008).

Patient falls have been a concern for nursing for many years. Inpatient fall rates range from 1.7 to 25 falls per 1,000 patient days (U. S. Department of Health and Human Services, 2008). The overall fall risk in acute care, especially for those patients over 65, is approximately 1.9 to 3 percent (U. S. Department of Health and Human Services, 2008). This results in more than 1 million falls per year. "Injuries are reported to occur in approximately 6 to 44 percent of acute inpatient falls" (U. S. Department of Health and Human Services, 2008, p. 1-196). Because falls have been consistently associated with quality of nursing care, they are included as a nursing quality indicator monitored by the American Nurses Association, National Quality Indicators (American Nurses Association, 2011).

Because of the risks of falls, especially with the older patients who are even more likely to experience higher illness severity, cognitive impairment (dementia or delirium), physical impairment, psychiatric conditions, surgery, and need for invasive medical devices, hospitals struggle to develop fall-prevention strategies. Even though the use of physical restraints has not been found to be effective in reducing falls, nurses, especially in the critical care units, continue to rely on the use of restraints to prevent falls and patient injuries (Hofso & Coyer, 2007). Nationally, 56 percent of restraint usage is in intensive care units (Minnick, Mion, Johnson, Catrambone, & Leipzig, 2007). In 1996, Mion, Minnick, and Palmer reported that restraints were used in 24.3 percent of patients in intensive care units and 3.4 percent of patients in adult non-critical care units. The number is estimated to be conservative and higher in today's critical care environments.

There are many adverse outcomes associated with the use of restraints, including complications of immobility, emotional devastation, serious injuries, and death. Restraints have been associated with increased injuries and patient extubations (Doerflinger, 2003). Between 1995 and 2002, the Joint Commission received reports of seven deaths or injuries related to bed rails; five cases involved patients 65 years of age or older and resulted in death by asphyxiation (JCAHO, 2002). Evans, Wood, and Lambert (2003) found 16 studies that reviewed restraint minimization and concluded that restraint reduction programs involving effective staff education reduce injuries and do not increase fall rates. According to the IOM, the number one recommendation for reducing risks to patient safety is orientation and training of hospital personnel (National Academy of Sciences, 2003). In fact, one of the recommendations in the IOM report, *Health Professions Education: A Bridge to Quality* (2003), was for foundations to develop and fund state-of-the art training settings focused on teaching and assessing competencies in clinical practice.

### **Simulation and Gaming**

The average age of the practicing nurse has increased (Carpenter, 2005), and yet, the nursing workforce includes more and more young people who have experienced high tech computer education. The learning style of the average student these days is vastly different than students of the past by virtue of the environment and the culture in which they have been raised (Seay, 1997). Staff development educators struggle to prepare today's entry-level registered nurses for effective decision-making in a new health-care climate that demands both skill and expertise with patients with high acuity levels. Bremner and Brannan (2000) describe the clinical decision-making simulator as an

innovative approach to teaching and learning decision-making skills. Gaming simulations facilitate knowledge acquisition and provide learning experiences through the use of synthetic tasks and environments. By providing a motivating learning environment, gaming simulation can stimulate higher order cognitive skills (Eastman, 2002). Also, experience has shown that using a simulation or game to explain or discover a particular problem or system is usually the best use of this method of learning (Randel, Morris, Wetzel, & Whitehill, 1992).

Games and simulations have been successfully used for years in education (K-12), military, business and adult education (Dempsey, Lucassen, Haynes, & Casey, 1997). Throughout the literature many different models of simulation are described and available as instructional methodologies. Besides a variety of electronic simulation and gaming modules, simulations of clinical scenarios are created in simulation laboratories using life-like mannequins so that students have a safe environment to practice patient care skills and procedures without placing patients at risk. Simulations, according to Seay (1997), are the products that result when one creates the appearance or effect of something else. Simulation games provide a simulated environment in which the participant solves problems that are intended to provide “students” with insight into the process or event from the real world that is simulated. The more specific the game or simulation, the better the student’s grasp of the material (Petranek, 1994). Research has shown that many students prefer gaming simulations and tend to retain the information longer than when taught in other ways (Randel et al., 1992).

According to Cooper and Taqueti (as cited in Jeffries, 2007), “Resusci® Anne” (a resuscitation trainer) and “Harvey” (a full-sized mannequin designed to train

professionals in cardiology) were introduced as the first simulation models in health care in the 1960s. Cooper and Taqueti (as cited in Jeffries, 2007) reported in their study (1980s) of 208 medical students' enhanced skill and sense of confidence in the students' ability to perform cardiac assessments at the bedside when trained at the bedside or with "Harvey."

Learning from military and aviation training, anesthesia educators created a simulated training environment for anesthesia administration in the 1980s (Jeffries, 2007). Since the birth of the World Wide Web and the Virtual Human Project during the 20<sup>th</sup> century, health care education has been transformed by the use of highly sophisticated human patient simulators (Jeffries, 2007). The United States (U.S.) Army has been in the midst of transforming its professional military education in order to assure military readiness (Marshall, 1981). Leaders in all fields must be taught to think; perform predictably; express emotion; receive, develop, and provide information; and, most importantly, command (Marshall, 1981).

A number of recent studies have demonstrated the value of simulations to improve a learner's situational understanding of a problem or situation and result in improved decision-making skills (Prevou, 2006). A study with eight expert U.S. Navy tactical decision-making teams demonstrated the value of gaming simulation to teaching the application of tactical decision-making skills and developing expertise (Morrison, Kelly, Moore, & Hutchins, 1998). Another implication from the study was the value of simulations in shaping the decision-making strategies of novice decision-makers and developing expert decision-making skills. A comprehensive training strategy for developing expert decision-making skills could be sequenced so as to lead learners from

more basic skills to more advanced skills under more demanding tactical situations. Intelligent agents, wizards, balloon help, or other “pop-ups” at appropriate times in the scenario could advise trainees on data relationships, requirements to shift attention, or specific applications of other key tactical skills. At the conclusion of each training scenario run, the United States Navy recommended that key indicators be calculated in order to assess decision-making performance and provide rapid feedback to learners. Such features as the ability to replay selected parts of the scenario, to view selected points in time, and to annotate the scenario with comments help learners debrief and evaluate their learning experiences (Morrison et al., 1998).

Electronic gaming has been used to promote evidence-based practice in nursing education at McMaster University School of Nursing (Mohide, Matthew-Maich, & Cross, 2006). A seven-step electronic game was developed to foster efficient information retrieval strategies and integration of the best research into problem-based learning tutorial discussions in small groups (Mohide et al., 2006). Although patient simulators are not new to nursing education, and in fact have become very complex, studies on the effects of simulation strategy on clinical decision-making is limited. Gaming simulation has proven to be an effective tool with midwifery students (Cioffi et al., 2005), and in teaching pediatric cardiovascular dysfunction (Cowen & Tesh, 2002). In another study, gaming simulation has been proven to assist nursing students in gaining a better understanding of ethics (Metcalf & Yankou, 2003). Sloane and Holmes (2009) describe the steps in the ethical decision-making process and how the use of gaming technology and innovative simulations can prepare employees and other personnel how to face ethical challenges in the workplace. Using complex computer games as primary “texts”



in composition courses has been found to contribute to the development of literacy skills (Alexander, 2009). Many students actively involved in computer and video gaming were found to develop literacy skills during their program. According to Warren et al. (2002), through a creative partnership between the University of Kansas School of Nursing and a Health Care Information Technology (HCIT) supplier, students are taught to think in a data driven mode and learn to process data from virtual patient case studies. Along with its corporate partner, the School of Nursing has developed and implemented a model curriculum (Simulated E-hEalth Delivery System) that, among other objectives, enhances the development of critical thinking and problem solving (Warren et al., 2002). Simulated E-hEalth Delivery System (SEEDS) is the first time that a live-production, clinical information system designed for clinical practice, is being used to teach nursing students in the form of simulation (Warren et al., 2002).

Although not computer simulation, Lu and Lajoie (2008) found that adaptive decision-making and collaborative discourse increased in a group of learners using interactive whiteboards compared to a group of learners using a traditional non-interactive method of responding to simulated medical emergencies. Simulation has been found to help bring students' abstract understanding into the concrete world in the undergraduate classroom by using active learning to link abstract understanding of complex issues to real-world decision making (Loggins, 2009). The CACTUS Project (Command and Control Training Using Knowledge-Based Simulations) is described by Hartley, Ravenscroft, and Williams (2008) as using knowledge-based computer methods to support and extend conventional training techniques. The project is concerned with training those who must manage large incidents where public order may be at risk. The

simulation operates as a decision-making exercise that includes planning, management, and debriefing evaluation.

Business simulation exercises are being used to enhance high order leadership, problem solving skills, and the capacity for innovation in new markets. The intent is to offer students, through new emerging technologies, more practice-oriented experiences to develop their conceptual understanding in decision-making and analytical thinking abilities through real business problems (Clarke, 2009). EagleRacing is an innovative simulation-based learning experience intended to teach corporate collaboration skills. Using online videos to involve individuals and teams in role-playing scenarios, managers and key decision makers develop group decision-making (Angehrn & Maxwell, 2009). The use of simulation for decision-making has been useful for demonstrating concepts in statistics (Franklin, Mulekar & Madhuri, 2006). In response to the increased cost of health and safety failures in the United Kingdom, efforts to create deeper cognitive learning, the use of interactive videos were substituted for traditional lecture-based courses (Cherrett, Wills, Price, Maynard, & Dror, 2009).

### **Critical Thinking**

Schell and Kaufman (2009) describe how critical thinking in Web-based online collaborative Problem-based Learning (PBL) tutorials was evaluated. Developing frameworks for evaluating critical thinking is of interest to many researchers. Hong Kong's tertiary educational system has taken steps to address the challenges of developing critical thinking skills. Case examples and post-course surveys were used to demonstrate that online pedagogy supports more student-centered learning approaches and a high degree of student engagement (Donoghue, 2006). Sendag and Odabasi (2009)

investigated how online problem-based learning (PBI) influenced undergraduate students' critical thinking skills and content knowledge acquisition. A pretest-posttest design was used. The experimental and control groups consisted of 20 students each. Although the online PBL group did not have a significant effect on content knowledge acquisition scores, there was a significant increase in critical thinking skills.

A literature review was conducted by Abate Bekele (2009) on critical thinking (CT) and problem solving (PS) skills in higher education and how they are impacted by Internet-supported learning environments. The reviewer indicated that students demonstrated critical thinking and problem-solving skills in different contexts. Little conclusions were reached. In a study by Kaveevivitchai, Chuengkriankrai, Luecha, Thanooruk, Panijpan, and Ruenwongsa (2009), computer assisted learning (CAL) was tried on second-year undergraduates in two comparable schools. The authors developed a computer-assisted multimedia module on vital signs assessment with animation and audio features for teaching in the classroom. Groups subjected to CAL/lecture and groups subjected to CAL/lecture/classroom demonstration gained significantly higher performance skills; however, there was no difference in factual knowledge acquisition. The aim of this study was to measure the effectiveness of CAL multimedia on students' achievement by supplementing the CAL to the traditional lecture either with or without faculty demonstration of vital signs measurement. Computer-assisted learning (CAL) is a method of self-study that allows learners to proceed at their own pace with immediate and continuous feedback (Kaveevivitchai et al., 2009). Not only did students demonstrate a significant improvement in performance when CAL was added to traditional lectures, most students using CAL had a positive attitude toward CAL and felt

more confident than those who learned by other teaching methods (Kaveevivitchai et al., 2009). Achievement was measured by using pretest and posttest on factual knowledge. According to the researchers, one explanation for the lack of significant differences among the groups was the students' attitude that the traditional lecture provided sufficient factual knowledge for their practical work. Thus, students limit their own learning according to their perceived need (Kaveevivitchai et al., 2009). "This CAL did not enhance their factual knowledge. It is expected that this CAL can in addition offer students realistic case-based scenarios that will help them develop problem-solving and decision-making skills"(Kaveevivitchai et al., 2009, p. 72).

The process of decision-making has been of interest to many educators and researchers. The poliheuristic (H) theory of decision-making, as described by Keller and Yang (2008), fails to address key aspects of the decision-making process. Although PH explains how leaders eliminate unacceptable options, it does not include the crucial threshold at which leaders reject options, whether the threshold varies across leaders and situations, and what factors affect the threshold. This study validates that situational context and leadership greatly affect the decision-making process.

In order to address the problem of large classes in medical education, DiLullo, Morris, and Kriebel (2009) describe an innovative approach to integrate basic science knowledge with patient assessment, diagnosis, and treatment. The traditional method of problem-based learning (PBL) was substituted with a series of online, case-based tutorials using a method of inquiry-based learning. Psychosocial dimensions of patient care were added to the case studies in the form of videos that demonstrate competencies of patient care, communication, and professionalism. No specific learning outcomes

were described. This study does, however, demonstrate the increasing use of technology in education and efforts to bring the real world clinical situations to the students' learning environment.

In a similar study with novice nurses, an interactive computer-assisted multimedia instruction program for intravenous injection training was conducted to evaluate its effect on the knowledge and self-perceived clinical practice in intravenous injection administration. The reactions of the staff nurses to the multimedia program as an on-job-training methodology was studied (Tsai, Tsai, Chai, Sung, Doong, & Fung, 2004). The results showed that the multimedia program had a significant effect on nurses' knowledge of intravenous injection, no significant effect on practice performance, and a high rate of satisfaction for the multimedia program (Tsai et al., 2004).

Review of the literature revealed little evidence of research investigating the effects of computer-assisted learning (CAL) on the retention of clinical skills and knowledge. Studies on the effects of competitive computer-assisted learning modules compared with conventional teaching methods on knowledge acquisition and cognitive improvements were also lacking (Alemán, de Gea, & Mondéjar, 2011). Alemán et al., (2011) reported in their study of 116 students, that the experimental group exposed to a competitive computer-assisted learning (CAL) module out performed the conventionally taught (face-to-face lecture and demonstration) group in knowledge gain. However, there was no significant difference between groups in retention at the 10-week follow-up. In fact, the data suggested slightly higher knowledge retention in the didactic group (Alemán, et al., 2011).

Bloomfield, Roberts, and While (2010) compared whether first year nursing students could learn and retain the theory and skill of handwashing more effectively when taught using computer-assisted learning compared with conventional face-to face instructional methods. Both teaching methods resulted in knowledge gains at immediate follow-up and at both the two and eight-week follow-up (Bloomfield et al., 2010). According to the authors, these findings suggested cognitive gain and knowledge retention. The similarity in the scores of both groups implied that learning was not influenced by the instructional method (Bloomfield et al., 2010).

Advanced interactive software was credited in part with significantly higher level of diagnostic accuracy than a control group of students on a one-month emergency medicine clinical rotation (Papa, & Meyer, 1989). The software interactively apprised students of the accuracy of their decisions against case studies and students were allowed to make modifications to improve diagnostic accuracy.

### **Competency**

Although educators may agree on the importance of competency-based education, there is less agreement on which competencies are important, how they should be demonstrated, and how they should be taught (Tilley, 2008). The challenge is evaluating cognitive, affective, and psychomotor mastery of skills throughout a career such as nursing (Tilley, 2008). According to the Accreditation Council for Graduate Medical Education (n.d.), competency-based education is an approach to teaching and assessment that emphasizes the identification and measurement of specific learning outcomes or competencies. Competency-based education uses demonstration of skills and knowledge to evaluate performance potential, whereas didactic course evaluation uses objective

testing strategies to determine cognitive achievements (Tilley, 2008). Research has been conducted in nursing and health care to explore competency in cognitive ability and clinical proficiency; however, a clear and established theoretical definition of competency has yet to be developed (Axley, 2008). The division between the theory-based and practice-based understanding and application of competency has limited administrators, educators, and practice-based nurses in responding to the constant change in nursing and healthcare practice standards (Axley, 2008).

Among the many definitions of competency, the Joint Commission (JCAHO), a not-for-profit organization that accredits and certifies healthcare organizations, requires measurement of competency for nurses. The JCAHO defines competency as "a determination of an individual's skills, knowledge, and capability to meet defined expectations" (JCAHO, 2006, p. 394). Some definitions of competency focus on reliance in relation to knowledge and the ability to adapt skills to a given situation (Axley, 2008). Competency most often is defined in terms as role outcomes, or knowledge, skills, and attitudes required for role performance, and then assessed by a behavioral standard (Axley, 2008). "Competency is clearly more than the mere attainment of skills as it also involves other qualities such as attitudes, motives, personal insightfulness, interpretive ability, receptivity, maturity, and self-assessment" (Axley, 2008, p. 218). Regardless of the various definitions of competencies, there is agreement that there are consequences of competency such as; patient safety, application of core knowledge, and internal motivation for continued learning. With knowledge and critical thinking/decision making skills/judgment as the components of competencies, it is concluded that "...the absence of competency results in serious medical errors, poor patient outcomes, and an

inability to make sound decisions" (Axley, 2008, p. 220). Nurses are expected to demonstrate integration and mastery of knowledge, interpersonal, decision-making, and psychomotor skills (Tilley, 2008). The literature reports a lack of reliable and valid methods for evaluating competency, particularly in education. Ensuring that measurement tools are comprehensive, reliable, valid, and free of bias is critical to the development and selection process (Tilley, 2008).

Critical thinking and knowledge construction are essential competencies to analyze and compare information, and solve highly complex real life problems. These competencies are more important in this age of information and technology than ever before (Wang, Woo, & Zhao, 2009). In the study by Wang et al. (2009), an interactive learning environment was designed involving three forms of interaction: individual reflections, group collaboration, and class discussions. The significance of collaboration and its role in solving problems and constructing meaningful knowledge was a focus of the study. One of the key objectives to the study was to help students develop critical thinking skills and meaningful knowledge with the use of interactive computer technology (ICT) (Wang et al., 2009). Although the authors concluded that the study revealed that the three forms of interaction had the potential to promote students' critical thinking, there were limitations to the study. Several outcomes of the study were valuable such as the reluctance of students to do their reflections on line and that the nature of discussion topics greatly influenced the depth of online discussions and knowledge construction (Wang et al., 2009). According to the literature, critical thinking and knowledge construction are closely related to each other. Critical thinking is a major component to knowledge construction and knowledge construction is an outcome of



critical thinking. Wang et al. (2009) espouse that knowledge construction is a personal process of accepting information into the existing cognitive structure (cognitive constructivism); however, it is also a social process of information sharing, negotiating, and revising based on social constructivism.

Critical thinking has been described as the metaphorical bridge between information and action (Rubenfeld & Scheffer, 2010):

Critical thinking in nursing is an essential component of professional accountability and quality nursing care. Critical thinkers in nursing exhibit these habits of the mind: confidence, contextual, perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection. Critical thinkers in nursing practice the cognitive skills of analyzing, applying standards, discriminating, information-seeking, logical reasoning, predicting and transforming knowledge (p. 31).

### **Summary**

Ever since the first IOM report (National Academy of Sciences, 2000), there has been national attention on reducing errors and raising the level of quality and safety of patient care. By 2013, reimbursement for care is expected to be based on quality indicators and patients' reports of their care experiences. Reducing errors includes improving organizational processes, identifying and reducing risks, and assuring that all personnel are competent and demonstrate expert critical-thinking skills and judgment in all clinical situations. Along with reducing errors, the national agenda includes reducing healthcare costs. These national mandates have prompted healthcare organizations to track their errors and near-misses and put new prevention processes in place. One of the

nursing measures for quality nursing care is patient falls (American Nurses Association, 2011). Restraints have long been used to prevent falls. Recent research has shown that restraints are not effective in reducing falls and, in fact, efforts should be made to eliminate the use of restraints if possible, to comply with new Medicare and JCAHO standards, and implement mandatory education on safe restraint management.

As organizations look for ways to reduce costs, all programs and services are being evaluated. In many organizations, the education department has been either eliminated or staff education has been decentralized and reassigned to other staff. Many hospitals and corporations have made the decision to either develop or purchase online educational programs. Few organizations have the resources to develop online training programs; however, many find it less expensive and less resource intensive than staff educators. Some organizations purchase one of many educational online software programs. Another issue for organizations is the increased reluctance of busy professionals to travel to physical classrooms on days off; therefore, the lack of attendance to in-service educational sessions has led to the decision to develop a cost-effective infrastructure of online learning (Bandy, 2010).

One of the questions that has come to the attention of organizations as they focus on training and development (T & D) activities is learning competence comprising cognitive, metacognitive, and motivational dimensions. Schulz and Roszngel (2010) investigated whether learning-competence variables predict success in learning. Since the workforce is aging, age was one variable included. The study found that learning competence predicted success in learning unrelated to age; however, was partially supported by memory self-efficacy, which might be affected by the effects of age under

unfavorable T & D conditions. According to Tilley (2008), consequences of competency remain largely undermined and untested. The current literature suggests that the gap between education and practice is largely dependent on the focus on competency in education.

The use of new pedagogies, such as simulations, is likely to increase. The effectiveness of such tools has generally not been examined in a systematic way. The effectiveness of a simulation used to teach the legislative process was conducted by comparing traditional teaching methods, such as lectures, to online simulation. Students who participated in the simulation group gained considerable knowledge of the legislative process compared to those in the traditional course (Lay & Smarick, 2008).

Multimedia are scientific and technical products that integrate various technologies such as image, audio, text, animation, and computer graphics. Multimedia emphasizes the interaction between users and system, and, as such, could become part of a new generation of CAL. The combination of media and CAL could provide realistic simulations to learners without causing risk to themselves or their patients (Tsai, et al., 2004).

Cognitive theorists believe that learning is an internalization event in which the information is encoded, stored and later retrieved. Information is incorporated and retrieved in four stages, paying attention to environmental stimuli, information processing by the senses, transforming the information into short-term memory. Information is then either disregarded and forgotten or stored as long-term memory (Kaveevivitchai et al., 2009). Colburn and Clough report that cognitive psychologists believe that students learn

more, accumulate and assimilate knowledge, and make more sense of the information when they take an active role in their learning (as cited in Kaveevivitchai, 2009).

With the growing use of online instruction, the benefits of traditional classroom instruction could be overlooked. Limited research has been done to determine the learning outcomes of computer simulation and, as reported in the review of the literature, there is little evidence that computer simulation is more effective than classroom instruction in developing competency in nursing. Healthcare organizations are rapidly looking to technology as a convenient, structured, and cost-effective way to do provide mandatory safety education to nurses without the research to demonstrate that online education is more effective in competency development than the traditional classroom methodology.

This study contributes to the current literature base on computer simulation as an instructional methodology in nursing in that it supports the value of traditional classroom instruction and raises questions about moving to a totally electronic methodology of teaching staff nurses in clinical settings. This study poses the question that perhaps although nurses report they like the convenience and speed of online mandatory education, learning outcomes may not be as beneficial.

Nurses are not likely to incorporate new evidence based information into their practice unless they understand the application and feel confident that they can successfully change their practice and improve patient care outcomes. This study also highlights that nurses learn from each other in the classroom and their confidence level increases by hearing how other nurses have been successful in changing clinical practice as a result of new evidence. Perceptions of self-efficacy lead to a higher level of

engagement in the learning tasks (Wigfield, 1997); therefore, an additional benefit of this study has been to highlight the need to study the significant role that affective factors play in learning.

## CHAPTER III

### METHODOLOGY

This chapter presents the research design methods used for analyzing the effectiveness of two instructional methodologies and answer the following research questions:

Research Question #1: Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in increasing staff nurse knowledge and understanding of the nursing care required to safely manage patients in restraints?

Research Question #2: Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in improving the situational understanding/critical thinking skills (decision-making skills) of experienced staff nurses in providing safe restraint care?

Research Question #3: Are electronic interactional simulations of real-life clinical scenarios more effective than traditional classroom instruction in developing overall staff nurse competency related to safe restraint care?

#### **Participants**

The subjects for this study were experienced staff nurses ( $n = 32$ ) with at least one year of clinical experience in an acute care setting. All participants were registered professional nurses employed at an acute care hospital who ranged in age from 22 to 69 years old. Almost 41 percent of the participants were 40-49 years old. Fifty percent of the nurses had 15 or more years of nursing experience. Nursing personnel are offered

continuing education on an ongoing basis; however, some mandatory education programs are offered annually; often online. Almost 85 percent of the subjects had at least four years experience with online education. Fifty percent of the subjects had seven or more years of experience with online education.

Table 3-1

*Demographics Frequencies of Participants by Hospital and Group*

	Hospital A		Hospital B	
	Didactic	Computer	Didactic	Computer
Overall ( $n = 32$ )	0	8	11	13
Age Group				
22-29			2	1
30-39			1	5
40-49		3	5	5
50-59		3	3	2
60-69		2		
Gender				
Male		1	0	0
Female		7	11	13
Race/Ethnicity				
African-American			1	0
Asian Pacific		1		
Caucasian		6	10	13
Latino/Hispanic		1		
RN Experience				
1-4 Years			2	1
5-10 Years			4	4
11-14 Years		1	1	3
15+ Years		7	4	5
Highest Degree Earned				
Associate's in Nursing		1	1	1
Diploma in Nursing		1		
Bachelor of Science in Nursing		5	8	8
Master of Science in Nursing			1	2
Master's (Other)		1	0	1
Bachelor of Science in Nursing and Bachelor's (Other)			1	1
Time Spent Using Computer for Online Education				
1-3 Years		1	1	3
4-6 Years		2	5	4
7+ Years		5	5	6

For this study, subjects were randomly assigned to two groups (A and B) representing the control and treatment groups by the researcher and research assistant. Names of subjects were written on small slips of paper and placed in a basket. As names were drawn from the basket, nurses were assigned on an alternating basis to either group A or group B. Both groups were checked for ample variation in age and experience. The goal of  $n = 64$  in each group was not achieved. Instead, the computer simulation group was  $n = 21$  and the didactic group was  $n = 11$ . Although both groups were initially similar in size, some subjects in the control group (didactic) were unable to complete the didactic session and posttest due to patient care demands, were ill, or failed to attend for personal reasons. One subject was terminated from employment prior to the scheduled session. A sample size of 32 resulted in a small effect size of  $d = 0.29$  (Faul & Erdfelder, 1992).

Permission to conduct the study was granted by the administration and managers of the hospitals. The subjects were fully informed of the rationale for the study, process, and methods for maintaining confidentiality. Their participation was voluntary and there were no consequences for refusing to participate in the study. Subjects were informed of the study in a variety of ways. An article was placed in both the hospital and nursing department newsletters at hospital B. Notices were placed in the nurses' mailboxes on the nursing units at hospital A. Direct contact was made to nurses about the study by nurse managers, graduate students, and hospital educators. Every effort was made to contact the nurses and provide various opportunities for them to participate in the study. Flexible hours were offered for educational sessions, including the night shift hours. At lunch and dinner sessions pizza and drinks were offered. Snacks were offered in mid morning and



afternoon sessions. The rationale was to limit the amount of time the nurses had to be away from their nursing units and patients. Staffing levels were very challenging at both hospitals and it was very difficult for nurses to participate during their shifts. In many instances, sessions were held before and after work so the nurses could participate.

The subjects were informed that their names were replaced with code numbers by the research assistant (a Ph.D. Professor Emeritus); only the code numbers appeared on all the data. All data was retained in the researchers locked files. The consent forms (Appendices A and B) conformed to the requirements of the Hospital Investigative Review Board (IRB) and the University of Kansas. Permission to do the study by the University of Kansas Human Subjects Committee (HSC) and the Hospital Investigative Review Board was obtained before the study started. At hospital A, the project was presented to the Nursing Research Council and was approved prior to beginning the study. A presentation to the nursing leadership was sufficient for approval at hospital B.

### **Instruments**

Three instruments were used as data collection tools: a demographic questionnaire (see Appendix C), a pretest, and a posttest (see Appendices D and E). Demographic information was collected on all participants such as education, age, race, gender, years of nursing experience, working hours with computer, and experience with online education to identify trends and contribute to further research. A pretest was designed to obtain baseline knowledge and practice related to the course content. The posttest was designed to determine if knowledge of content, situational understanding/critical thinking skills (decision-making skills) related to patient safety,

and clinical competency (ability to incorporate new knowledge into clinical practice) increased.

### Validity and Reliability of Instruments

With the assistance of faculty members from the School of Nursing at a local university and two trained research assistants, all instruments were objectively scored and recorded. Pretest and posttest questions were submitted to members of the nursing faculty to score as to critical thinking or knowledge questions. Reviewers were, also, asked to evaluate the questions as to accuracy of content. The only questions retained for the study were those that all reviewers agreed measured study variables to ensure construct validity.

Internal consistency was determined by calculating coefficient alphas as part of statistical analysis. Results indicated low internal consistency for the knowledge and situational understanding/critical thinking subscales, and the overall competency scale for both pretest and posttest scores (see Table 3-2).

Table 3-2

<i>Internal Consistency Reliability Coefficients</i>				
	<i>N</i> Items	Mean	SD	Cronbach's $\alpha$
Overall Competency				
Pretest	17	11.68	1.469	-0.230
Posttest	17	12.03	1.816	0.338
Knowledge Subscale				
Pretest	8	6.09	1.201	0.169
Posttest	8	6.31	1.176	0.228
Situational Understanding/Critical Thinking Subscale				
Pretest	9	5.55	1.060	-0.282
Posttest	9	5.68	1.194	0.207

Faculty members at the School of Nursing and the clinical educators at both hospitals reviewed the restraint care instructional content to ensure that the content taught was accurate, up to date, comprehensive, and met the mandatory educational needs of the staff nurses. Educational content related to specific hospital policies was added and adapted to the individual facility. These differences required that two slightly different computer modules and didactic scripts be developed. No questions on the pretest or posttest referred to the differences in hospital policies regarding restraint care.

The scenarios used for testing and analysis in this study were designed in a way that supported critical thinking and informed decision making. Over 15 scenarios were reviewed by nursing faculty and hospital clinical instructors for content accuracy and their ability to test knowledge and critical thinking skills. The six scenarios selected were those chosen by all reviewers. Curriculum for the scenarios was based on the National Patient Safety Goals (JCAHO, 2011).

### **Procedures**

Human experts typically evaluate a situation, and use some general heuristic derived from previous experience to choose an action (Morrison et al., 1998). If the situation appears similar to one that decision makers have previously experienced, the situation is recognized and the preferred action becomes obvious (Morrison et al., 1998). Expert staff nurses are good examples of such experts that exhibit “recognition-primed decision making” (Klein, 1993). Nurses, like military commanders, make critical decisions in realistic situations by considering general classes of explanations and select from those that seem plausible to create a working hypothesis, and then rapidly adjust

this hypothesis after evaluating it (explanation-based reasoning). Expert decision makers rapidly develop reasonable hypotheses to explain situations (Morrison et al., 1998).

The curriculum selected for this study was a component of the mandatory in-service program required for hospital accreditation by JCAHO (2011). Nursing staff must complete, on a yearly basis, the mandatory in-services on critical topics and clinical skills related to nursing practice and regulations such as fire and safety that are required by accreditation and licensing bodies. Although new information is added and changes in practice are introduced, nurses tend to find much of the information repetitive and the process time consuming; thus, little learning occurs.

Every effort was taken in this study to keep class content consistent between study groups as well as between group sessions. Although some content was review, subjects were evaluated as to their competency and ability to integrate old and new knowledge into their clinical decision-making. Content related to the new regulatory standards for restraint care were unfamiliar to all study participants.

The instructional topic for this study was selected by the study hospitals. In an effort to elicit their support for the study and conserve some of their educational resources, the hospitals were asked to select a topic that would support their quality of care and compliance efforts. Both hospitals were concerned about nursing staff compliance with new regulations regarding restraint management and their efforts to reduce the use of restraints had been unsuccessful. Both hospitals believed that the nursing staff depended greatly on the use of restraints to prevent falls and extubation in ventilator patients in the Intensive Care Units. Both hospitals reported that their fall rates were not acceptable and expressed concern about the increased risks of falls and the

liability related to patient falls. Restraint management was, therefore, selected as the topic for the study.

Development of the DMS required computer technology and application of the same curriculum content as presented in the traditional classroom. Various software products were evaluated; however, cost and access were key factors in the selection process. The product chosen was web-based and did not require access to the hospitals' mainframe computer systems. The decision was made to avoid the firewall issues raised with some software products. Access links (see Appendix F) directly to the modules were provided to participants at the beginning of the computer sessions. The advantage of the web-based modules was that subjects could access the educational module from any location through the internet. The disadvantage of the web-based module was the difficulty in tracking the assessment tools by subject. The researcher had to take great care to keep track of the subjects and their pretests and posttests with a code by hand and track subjects by computer log on and log off times.

In computer interactional simulation, nurses can be presented with feature matching strategies that are the basis of operational decision-making. Displays consistent with naturalistic decision-making strategies provide the most useful support to expert decision-makers and facilitate rapid development of situational assessments. Displays or scenarios that support both feature matching and explanation based reasoning are best for complex decision-making tasks. Some researchers have recommended the explanation based reasoning display or simulation for less experienced decision-makers (Morrison et al., 1998). This study was based on the assumption that when experienced professionals are presented with scenarios that they perceive as real, make decisions, and get

immediate feedback as to the consequences of their decisions, they are less likely to make the same errors outside of the training environment (Prevou, 2006).

## **Classroom Instruction**

This study was designed to assess knowledge, competency development, and the dimensions of critical thinking and situational understanding (SU) with the different training strategies. The control group received the classroom instruction. Classroom instruction was standardized and course content was consistent for all subjects in the control group. Course content for the classroom instruction mirrored that provided for the treatment group. The researcher assured consistency of content and instruction. To assure consistency, all didactic groups received the same lecture by the same instructor. The didactic lectures were scripted (see Appendices G & H) to match the computer modules for each hospital.

The traditional classroom education was held in a mediated classroom at the hospital (Hospital B) using a PowerPoint presentation. There were no subjects in a didactic group at Hospital A. Classroom content was scripted and identical to the computer module with the exception of the interactive scenarios. Participants were seated in a traditional classroom fashion in front of the instructor. Although every effort was made to prevent discussion and questions, subjects shared their experiences and commented on the content. Interaction among participants was related to the content presented and how they felt about the content that was new to them. All didactic sessions were 60 minutes in length including the time to take the demographic surveys and the pretests and posttests.

## **Electronic Interactive Simulation Training Sessions**

For this study, the interactive computer training modules on restraint management were developed as power point presentations with intermittent real-life clinical scenarios

that focused on individual teaching points. The scenarios closely represented actual clinical situations nurses are likely to experience in their clinical practice. Multiple choice questions followed each scenario that offered clinical care options. Once an option was selected, immediate feedback was provided. The next screen immediately let the subject know if the answer chosen was best practice. If an incorrect response was chosen, a screen appeared that explained the rationale for why the selected option was incorrect. The best choice was always provided to the subject with a clinical explanation. According to the literature cited, if participants are given a rationale for the best choice, they are more motivated to replicate the appropriate action in their clinical practice. All computer groups received the same scripted introductory information (see Appendix I) by a trained research assistant (a Ph.D. university faculty member). The simulation modules were self paced; however, all participants completed the computer module within the 60 minutes scheduled.

. The computer scenarios (see Appendix J) incorporated “desired actions” for the dependent variables, knowledge and critical thinking/situational decision-making. They allowed the researcher to determine how the subject perceived the situation and how that perception developed or improved across the scenarios. The desired actions reflected decisions based on good situational understanding of the scenarios, the proficiencies within the scenarios, and the level of critical thinking. Determination of enhanced critical thinking skills and knowledge was based on the nurses’ selection of the desired actions. The inclusion of the desired actions incorporated the mechanism for measurement into the scenario rather than relying on subjective judgments of situational understanding. Due to software limitations, the data related to how subjects answered the individual



scenario questions could not be tracked; therefore, the measurement of variables was determined by the posttest scores.

### **Overview of Procedures**

Course content and the pretest/ posttest questions were developed by the researcher and reviewed by content experts for knowledge and critical thinking. The pretests were administered just before all training sessions and posttests were administered immediately following all training sessions. The pretests and posttests were incorporated into the computer modules, whereas, the subjects were provided paper tests in the classroom sessions. All subjects were allowed to leave the computer sessions when finished. None of the educational sessions extended beyond the 60 minute time frame.

The purpose of this study was to measure the effectiveness of simulation tools over traditional instruction (independent variables) and to provide curriculum that will improve situational understanding (SU) skills and knowledge of nurses in clinical practice. The goal was to measure the nurses' responses in a specific analysis situation, to determine situational analysis skills, and situational understanding during a computer simulation compared to traditional non-electronic decision exercises in the continuing education program. The focus of content development included areas of noncompliance in the clinical practice environment, new content, and mandatory review. To assure that the effects of the intervention were tested, the content was also reviewed with a sampling of experienced staff nurses.

### **Research Questions**

Table 3-1 outlines the research design to answer the following research questions:

Research Question #1: Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in increasing staff nurse knowledge and understanding of the nursing care required to safely manage patients in restraints?

Research Question #2: Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in improving the situational understanding/critical thinking skills (decision-making skills) of experienced staff nurses in providing safe restraint care?

Research Question #3: Are electronic interactional simulations of real-life clinical scenarios more effective than traditional classroom instruction in developing overall staff nurse competency related to safe restraint care?

### Research Design

The treatment group was compared to the control group overall as well as individually by each of the dependent variables.

Table 3-3

Research Design (Adapted from Prevou, 2006)

Attribute (Dependent Variables)	Knowledge	Situational Understanding / Critical Thinking Skills	Overall Competency Total Score
Traditional Instruction (Control Group)	$\bar{x}$	$\bar{x}$	$\bar{x}$
Treatment 1 DMS	$\bar{x}$	$\bar{x}$	$\bar{x}$

### Data Analysis

The research study was designed to be quantitative in nature. Analysis of Covariance (ANCOVA) was conducted to determine if significant differences occurred

between variables. ANCOVA refers to analyses with both qualitative and quantitative independent variables. Using this mixed procedure allowed the researcher to model both qualitative and quantitative variables. In ANOVA type models, hypotheses about qualitative or interactions among qualitative variables are tests of means or differences among means. The assumptions of ANCOVA combined both the assumptions of regression and ANOVA. In the case of tests of treatment means, if the covariate (Pretest) was responsible for some variation in the dependent variable, use of analysis of covariance removed the variance from the error or random variance. This resulted in improved sensitivity of the tests for treatment effects. The independent variable, teaching strategy, was studied by dividing the subjects into two groups, control group (traditional classroom) and treatment group (electronic simulation). The dependent variable was the posttest.

Level of significance was at the 0.05 level for ANCOVA on the total score and 0.025 level for subscale scores. The lower significance level was appropriate because the results of those analyses are dependent on the total score.

Demographic data and subject evaluations were reviewed for variables that could explain effect differences in treatments. Also, insights provided from the review helped to guide future research.

### **Technology Control**

In order to control for the inexperience of the subjects with new technology, each student was provided with a scripted introduction to the simulation technology. No specific orientation to the use of the computers was necessary because all subjects were

very familiar with the computers in their hospital settings. A member of the research team provided consistent oversight and instructions to the computer groups.

### **Assumptions**

The first assumption was that subjects would, if selected, participate in the simulation-based curriculum as part of the mandatory professional education program. All but two nurses who were selected participated in the study. Schedule conflict and an injury prevented the two nurses from participating. Secondly, it was assumed that all the nurses had baseline knowledge of patient safety and similar enough experience in clinical practice to create a homogeneous population from which to sample.

### **Limitations**

Through design, every effort was made to address the limitations of this study. The interactive courseware, methods, and instruments were built from scratch without previous testing for comparison. Consultation with more than one specialist in developing computer simulations was done. The focus of the technical support was the selection of the platform software, development of the interactive aspects of the power point design, and automation and tracking of assessment results.

Nurses are highly stressed in today's healthcare environment and mandatory in-services are seen as disruptive. Motivation to attend educational programs and change practice is a common problem. Efforts were made to make the study curriculum interesting and stimulating to the experienced practitioner, and relevant to their practice. Some nurses questioned why this topic was chosen and how it differed from the hospital mandatory education on the topic. One thing that motivated the nurses to attend and see some benefit of attending the sessions was that each nurse received a personalized

professional certificate. Administration at hospital B agreed to accept the certificates as credit toward advancement within the Professional Career Ladder and credit toward the requirement of mandatory education on restraint care for one year. Presence of the researcher at all teaching sessions provided an opportunity for the researcher to answer questions and clarify how the study fit within the educational programs at the study hospital sites. Interaction outside of the educational sessions among nurses who participated in the study was unavoidable; however, there was no evidence that this interaction affected the findings.

### **Internal Validity**

Threats to internal validity were addressed by random selection of subjects, random assignment of subjects to groups, and the administration of a pretest prior to training. The threat of low statistical power was addressed with a power analysis to ensure an adequate sample size for each group. Group means were used rather than individual scores to address the threat of low reliability of measures. All subjects were treated justly and more than one dependent variable was measured.

Participants were randomly selected and randomly assigned to groups under the supervision of an observer. Simulation courseware, scenarios, and instruments were refined and adapted to nursing. Patient safety content was developed with the assistance of the quality department staff, educators, and managers at both hospital sites; at least one content expert; and a technical expert. Instruments were tested prior to the study on a randomly selected group of nurses with various levels of experience. A pilot study was conducted at hospital A to test the computer simulation module and obtain feedback regarding study instruments. Treatments were refined based on feedback and some

reported confusing questions on the pretests and posttests were eliminated. Every attempt was made to control the independent variable so that extraneous and unwanted sources of systematic variance had minimal opportunity to operate. Classroom instruction was consistent for all subjects assigned to groups receiving classroom instruction and content was the same for both study groups. Maintaining consistent content in both groups allowed a more valid comparison to the simulation method.

Participants were asked to avoid interaction with their peers regarding the study and keep the process and their experience confidential. The study was presented as generally as possible without bringing attention to the simulation as a focus of the study. Interaction between subjects and instructors as well as consistency of courseware was monitored.

### **Construct Validity**

For purposes of this study, construct validity was defined as a type of validity in which the conformity of theoretical expectations to empirical evidence is explored (Powers and Knapp, 2006). In order to address construct validity, treatments were defined precisely, standardized, and repeated measures were utilized in the research design by participants in both groups completing a pretest before instruction and a posttest immediately following instruction.

### **External Validity**

Threats to external validity were addressed by the random selection of subjects from a well-defined population and the random assignment to groups. Although the nurses selected had a minimum of 1 year of clinical experience, their types of experience and expertise differed. Also, they differed somewhat in experience with computer

technology, educational background, and demographically by age, gender, and race. Demographic data was collected and considered as part of the analysis. Efforts were made to ensure that sampling techniques and study samples are representative and support generalizability of findings as much as possible. A literature review was conducted to determine if prior evidence was consistent with the hypotheses.

## CHAPTER IV

### RESULTS AND DISCUSSION

#### **Chapter Overview**

The purpose of this study was to compare, through performance measurements, computer interactive simulations to traditional classroom instruction in promoting knowledge development regarding safe restraint management, improve situational understanding and enhance the critical thinking skills of experienced staff nurses. Also, the study was designed to evaluate whether electronic interactive simulations are more effective as an instructional methodology in promoting overall clinical competency in managing the care of patients in restraints than traditional classroom instruction.

The discussion within this chapter is divided into six sections. The first section addresses the demographics. The second section summarizes the quantitative research by summarizing the group differences. The third section addresses the research regarding Research Question #1: Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in increasing staff nurse knowledge and understanding of the nursing care required to safely manage patients in restraints? The fourth section addresses Research Question #2: Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in improving the situational understanding/critical thinking skills (decision-making skills) of experienced staff nurses in providing safe restraint care? The fifth section addresses Research Question #3: Are electronic interactional simulations of real-life clinical scenarios more effective than traditional classroom instruction in developing



overall staff nurse competency related to safe restraint care? Finally, the sixth section is an overall discussion of findings.

### **Descriptive Statistics**

Thirty-one females and one male participated in this study from two locations: hospital A ( $n = 8$ ) and hospital B ( $n = 24$ ). Hospital A is a 586-bed acute care center that provides inpatient, outpatient and a variety of community outreach services. Hospital B is a non-for-profit Catholic health care provider with 378 licensed beds. Both facilities are located in the same Midwestern city not more than a mile apart. Tables 4-1 to 4-5 include frequencies of demographic information of the sample population including race/ethnicity, age group, RN experience, highest degree earned, and time spent using a computer for online education.

Over 90% of the participants were Caucasian. There was very little diversity within the population sample. Thirty-two of the participants were between 22 and 69 years old, with 40.6% in the 40 to 49 year age group. Half of the study sample had 15 years or more experience. Less than 10% of the participants had 4 years of nursing experience or less. Almost 72% of the participants had Bachelor degrees in nursing or other; 65.6% were Bachelor of Science Degrees in Nursing. The fact that over 87% of the participants had a Bachelor's or Master's degree indicates that the population sample was well educated. Half of the participants had been utilizing computer education for seven years or more. About 85% of the participants had at least four years of experience with on-line education, which indicates that the population sample was familiar with using the computer as an educational mode of learning.

Table 4-1

<i>Race/Ethnicity Frequencies</i>		
Race/Ethnicity	Frequency	Percent
African-American	1	3.1
Asian Pacific	1	3.1
Caucasian	29	90.6
Latino/Hispanic	1	3.1
Total	32	100

Table 4-2

<i>Age Group Frequencies</i>		
Age Group	Frequency	Percent
22-29	3	9.4
30-39	6	18.8
40-49	13	40.6
50-59	8	25.0
60-69	2	6.3
Total	32	100

Table 4-3

<i>Frequencies of RN Experience</i>		
RN Experience	Frequency	Percent
1-4 Years	3	9.4
5-10 Years	8	25.0
11-14 Years	5	15.6
15+ Years	16	50.0
Total	32	100

Table 4-4

*Frequencies of Highest Degree Earned*

Highest Degree Earned	Frequency	Percent
Associate's in Nursing	3	9.4
Diploma in Nursing	1	3.1
Bachelor of Science in Nursing	21	65.6
Master of Science in Nursing	3	9.4
Master's (Other)	2	6.3
Bachelor of Science in Nursing and Bachelor's (Other)	2	6.3
Total	32	100

Table 4-5

*Frequencies of Time Spent Using Computer for Online Education*

Time	Frequency	Percent
1-3 Years	5	15.6
4-6 Years	11	34.4
7+ Years	16	50.0
Total	32	100

Group differences were analyzed using analyses of covariance (ANCOVA), testing at a significance level of  $\alpha = 0.05$  for overall competency and  $\alpha = 0.025$  for the knowledge and critical thinking sub-scales. Table 4-6 contains the descriptive statistics of each group's scores and sub-scores on the pretests and posttests.

Table 4-6

*Group Pretest and Posttest Mean Scores (Std. Dev)*

	Pretest			Posttest		
	Overall Competency	Knowledge	Critical Thinking	Overall Competency	Knowledge	Critical Thinking
Didactic ( <i>n</i> = 11)	10.91 (0.831)	5.55 (1.128)	5.36 (1.206)	12.45 (1.368)	6.64 (1.027)	5.82 (0.982)
Computer ( <i>n</i> = 21)	11.71 (1.586)	6.14 (1.276)	5.57 (1.207)	11.71 (2.101)	6.00 (1.183)	5.71 (1.309)

### Research Question #1

*Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in increasing staff nurse knowledge and understanding of the nursing care required to safely manage patients in restraints?*

A one-way ANCOVA was conducted on posttest knowledge sub-scores across experimental and control groups, with pretest knowledge sub-scores as a covariate. Results indicated there was a significant difference between didactic and computer groups with the didactic group outperforming the computer group:  $F(1,29) = 8.817$ ,  $p < 0.01$ . This result indicated a small effect size:  $d = 0.29$ . The small effect size of  $d = 0.29$  indicates that the power of the test is weaker due to the small sample size (Cohen, 1988; Faul & Erdfelder, 1992).

### Research Question #2

*Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in improving the situational understanding/critical thinking skills (decision-making skills) of experienced staff nurses in providing safe restraint care?*

A one-way ANCOVA was conducted on posttest critical thinking sub-scores across experimental and control groups, with pretest critical thinking sub-scores as a covariate. Results indicated there was not a significant difference between the didactic and computer groups at the  $\alpha = 0.025$  level:  $F(1,29) = 0.093$ ,  $p > 0.025$ .

### **Research Question #3**

*Are electronic interactional simulations of real-life clinical scenarios more effective than traditional classroom instruction in developing overall staff nurse competency related to safe restraint care?*

A one-way ANCOVA was conducted on overall competency posttest scores across experimental and control groups, with overall competency pretest scores as a covariate. Results indicated there was not a significant difference between didactic and computer groups:  $F(1,29) = 2.740$ ,  $p > 0.05$ .

### **Summary**

The results of the quantitative analyses of this study do not support the hypotheses that computer interactive simulation is more effective than traditional classroom instruction in regards to the critical thinking/situational understanding, knowledge sub-scales, and overall competency. The statistical power was limited in this study (effect size was small;  $d = 0.29$ ), and weakened by the small sample size. Using the effect size estimate in comparing didactic to computer simulation groups, there was no significant difference in outcomes between traditional and computer-based instructional methods.

In light of the significant findings in Research Question #1 regarding the increase in knowledge scores of the control group, the value of didactic instruction should not be discounted. The results of this study provide a basis for further commentary as to the

effectiveness of computer simulation and traditional classroom methods of instruction. In addition, the results of the data analyses encourage on-going dialogue and research on instructional methods that contribute to a higher level of competency in nursing practice by increasing basic knowledge and critical thinking/situational understanding.

Even though the hypotheses were not supported, the study highlighted the importance of further research and further refinement of research design and methodology. For example, as an effect of the demographics, the population of nurses might not find simulation beneficial as a learning modality. The dependent variables were perhaps not appropriate for simulation or were not defined precisely enough to measure. Other problems could be lack of validity and/reliability of instruments, inconsistencies with instruction and/or content of classroom instruction, or interaction of nurses with peers. Perhaps instructional methodologies, including simulations, were inadequate. Another cause could be that content was not clear, motivational, interesting, precise enough, or relevant enough to the nurses' clinical world to result in enhanced situational understanding of patient safety content.

Hypotheses that computer interactive simulation is more effective as an instructional method were not supported. The current trend toward simulation should be guided by valid and relevant research. Studies such as this could be the spring board for action research and help bridge the gap between theory, research, and practice. The results of this study add to the current literature on the effectiveness of instructional methods and support the ongoing questions as to how best to enhance the overall competency of experienced staff nurses in clinical settings. Without attention to the nature of nursing practice and the intuitive need nurses have for interpersonal

communication, the learning outcomes may not be achieved with computer education. Also, additional research of other aspects of simulation, including further development of simulation methods and, perhaps, integration of simulation into traditional classroom instruction is needed. Since this study supports the value of traditional classroom instruction, other options such as hybrid (mixed method) instruction should be evaluated as an option to using structured computer educational programs alone. Future studies could also provide a framework for designing a range of responses to the scenarios from novice to expert. An important goal of continuing education is to advance the skill level of the professional nurse and gain additional insights as to the best methods for advancing practice toward the expert level.

Cognition suggests that the mind is an active force that constructs one's reality, selectively encodes information, performs behavior on the basis of values and expectations, and imposes structure on its own actions (Jones, 1989). An individual's sense of reality is formed by the interaction of the environment and cognitions. Only by understanding the processes involved in the construction of reality is human behavior able to be changed. The goal of training staff nurses on new technology, for example, is to change behavior and motivate the nurses to use the technology to the fullest extent of its capabilities. Simulations and gaming can be designed to allow students to create and manipulate systems and problems within certain parameters without the constraints of time and space. Such strategy helps students actually experience a system or problem and not just read or hear about it. For purposes of teaching staff nurses how to use electronic medication administration devices, for example, nurses can experience the "aha" of a medication error or near miss. Experiencing the medication error in a safe

simulated setting has a powerful impact on the motivation of nurses to use the electronic device and see its value to their practice.

Although organizations are moving toward computer simulations to accomplish these goals, this study does not support the hypotheses that computer interactive simulation is more effective than classroom instruction. This study supports the value of classroom instruction; however, since there were no differences in critical thinking/situational decision-making skills, the researcher suggests that classroom instruction be redesigned and new more creative approaches to classroom activities that promote critical thinking be explored. The researcher also suggests that electronic simulation focus on the benefits of classroom instruction by increasing, for example, the student interpersonal interaction and socialization that appear to enhance knowledge acquisition. As technology advances more student face-to-face interaction and designed opportunities for sharing of ideas and experiences should be a priority. The results of this study contribute to the literature base on teaching methods and support the need for the development of more effective instructional methods. There was essentially little difference in the two instructional modalities except for knowledge development. The results of this study support the contributions of classroom instruction to cognitive learning. The interactions between participants and between participants and instructor validate the affective benefits to classroom instruction.

Further research is needed in other acute care settings and of other curriculum content. Further, additional research is needed to examine the view that simulations provide more motivating learning environments and promote the accomplishment of objective learning goals such as the acquisition of knowledge. Proponents of electronic



interactive simulation describe the benefits of scaffolding experiences and the use of synthetic tasks that occur in a synthetic task environment; therefore, dependence on the development of an innovative skill set. It is important to research these interactions as well as the skill sets and techniques required to effectively enhance higher-order cognitive skills through these environments. To successfully instruct expert professionals, hospitals must incorporate new experiences created by using the forms of expression found in emerging multimedia technology. Such media as gaming and simulations have characteristics that uniquely support social and cognitive processing in different ways. The classroom, however, offers a unique environment for nurses to interact and by sharing experiences learn from each other and gain support from their peers to implement new knowledge into their clinical practice based on new evidence. Additional research is needed to validate that simulations add motivational characteristics to the learning process (Eastman, 2002).

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

*"We learn more by looking for the answer to a question  
and not finding it  
than we do from learning the answer itself."  
- Lloyd Alexander*

The literature is inconclusive that computer interactive simulation is more effective in competency development than traditional classroom instruction. According to a study by Sendag et al. (2009), learning in an online problem based learning group of undergraduate students did not have a significant effect on the content knowledge acquisition scores; however, there was an increase in the critical thinking skills. Computer-assisted instruction as a teaching method has been documented in the literature with varying performance outcomes (Tsai et al., 2004). The results of this study are consistent with what was found in the literature as no differences were found in favor of electronic interactive simulations. However, the didactic group significantly outperformed the computer group in knowledge acquisition.

This study contributes to the overall body of knowledge regarding computer-assisted learning in that it supports the need for further study of the educational advantages of computer interactional simulation. The population sample in this study was randomized and all subjects volunteered to participate in the study. There were no differences between groups and the groups represented nurses from a variety of clinical settings. To what degree the results are generalizable is unknown because of the small sample size.

Outcomes of this study were affected by the low internal consistency of test items and the question as to whether the new, less familiar content in the module and lecture content was assessed in the pretests and posttests. Although the literature described the increasing use of instructional technology in healthcare organizations, the outcomes of this study point to the difficulties of conducting research in hospital settings and the complexity of adult learning needs and learning environments. Instructional technology has been advancing at a rapid rate; however, this study was limited by the lack of sophisticated software with assessment capabilities.

### **Research Questions**

This study was guided by three research questions:

Research Question #1: Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in increasing staff nurse knowledge and understanding of the nursing care required to safely manage patients in restraints?

Research Question #2: Are electronic interactive simulations of real-life clinical scenarios more effective than traditional classroom instruction in improving the situational understanding/critical thinking skills (decision-making skills) of experienced staff nurses in providing safe restraint care?

Research Question #3: Are electronic interactional simulations of real-life clinical scenarios more effective than traditional classroom instruction in developing overall staff nurse competency related to safe restraint care?

This study tested the hypotheses that scenario-based computer simulations improve the competency level of experienced staff nurses and ultimately lead to safer

clinical practice. The intent of this study was to increase staff nurses' knowledge and situational understanding in organizational learning environments.

Although the analysis of data outlined in Chapter IV did not support the hypotheses that electronic interactive simulations are more effective as a teaching methodology, the study itself led to a deeper understanding of the problem of staff nurse continuing education. In this chapter, overall conclusions and their implications to the use of different instructional methods in the clinical setting to improve clinical judgment are presented. Description of the limitations and lessons learned for future research are also offered.

Today's healthcare system has been forced to focus on the safety and quality of patient care. As in no time in the past, all patient care providers are being held to a higher standard of care. Organizations are taking expensive and resource intensive measures to improve their patient care outcomes. For example, patient outcomes are much more transparent and visible to the public. Patients are encouraged to select their providers based on outcome data. Also, hospitals and many other providers are now paid according to their outcomes and reimbursement can be withheld when errors lead to bad outcomes. It is, therefore, imperative that providers be well educated and motivated to make sure their practice is evidence-based. Whether the contemporary term is critical thinking, situational understanding, clinical reasoning, or judgment, nurses must be clinically safe and be competent enough to make the "best" decisions in chaotic healthcare environments. The questions raised in this study focused on how best to improve adaptive cognition skills necessary to prepare staff nurses to meet the demands of the ever increasing complexity of clinical practice.

This study focused on overall competency, which in nursing, is defined as "the ability to think and act effectively and safely" (Johnson & Webber, 2010, p. 61).

According to Johnson & Webber (2010), competency results from the ongoing development of knowledge, skills, values, experience, and the ability to understand a clinical situation and apply clinical reasoning and decision-making.

This research explored the benefits of electronic scenario based interactive simulations and contributes to the discussions of how best to enrich the learning environments in the future. Simulation has become an integral part of nursing education so that nurses and nursing students can develop and practice skills in a safe educational environment. Computer simulation of real-life scenarios is a familiar method of instruction in many settings and has often replaced traditional classroom instruction. This has occurred without the research to support its overall effectiveness in nursing, especially in clinical settings with experienced staff nurses. In order to meet the needs of future generations, we must develop educational methods that exploit technology and maximize its benefits but not at the expense of the benefits of the classroom experience. Continued research, such as this, is critical to understanding the best use of technology in different learning environments.

The attitude toward computer simulated learning varies. Many faculty in healthcare settings lack the training and experience needed to develop quality programs. In both of the organizations studied, computer programs were the primary method for providing continuing education. The programs were purchased from educational companies and tailored to the policies and procedures of the organization. One of the insights gained from this study were the negative attitudes most of the nurses expressed

about the mandatory training in general. Many expressed that the yearly mandatory competency programs on line were a waste of time and that the programs are the same year after year. They stated they go through the computer modules as quickly as possible and since nothing is new, "I just click the answers automatically without much thought." This attitude toward mandatory education does not promote change in practice and as a result, new evidence based research is not implemented. Recommended changes in practice are not likely to be embraced because nurses cannot relate the improved outcomes to their practice.

### **Pilot Study**

A pilot study of the computer module was conducted at Hospital A in June, 2010. Participants (n = 5) were randomly selected from various units throughout the hospital by a hospital representative to participate in the pilot. The purposes of the pilot study were to assure that the module was functional and easily accessible on the Web through hospital computers, the module could be completed within the 60-minute timeframe, and to gain initial feedback regarding the module and the pretests and posttests. As a result of the pilot study, minor modifications were made to the pretest and posttest items, and scripted instructions for the participants in the computer group were developed. Nurses made the following comments about the computer module:

*"I had to think to answer the questions and that is not usually the case when I do the mandatory in-services."*

*"Content was accurate."*

*"I had a problem with one question but had no problem navigating thru it (the module)."*

*"It was fun."*

*"It helped keep me aware of any changes in policy that I need to know in more of a real way."*

*"Some screens have the title cut off."*

*"Can you re-do sequencing of some questions or allow more choices? I can't just check all that apply."*

*"This is the way in-services should be. I learned so much and thought I knew a lot about restraints."*

*"I will definitely do things differently. I had no idea that I needed to do things this way."*

*"The first question was confusing."*

*"The content was good and it held my attention...interesting."*

*"I was glad it did not take more time. I could get going and go at my pace. I was in a hurry and like that."*

All concerns were addressed as a result of the pilot study. Three test items were eliminated and two items were reformatted. Several of the nurses could cite specific things they learned and how they planned to change their practice as a result of what they learned.

### **Barriers to Completion of the Study**

There were many barriers to completing the study. Both facilities experienced serious staffing issues related to the economy. Recruitment for subjects was very difficult and extended from July, 2010 to April, 2011. Several strategies were used to attract subjects. Hospital B marketed the study in the hospital and nursing newsletters. Managers encouraged their staff to participate and notices were placed in the nurses mailboxes at both hospitals. Alternate times, pizza lunches, snacks in morning and afternoon sessions, and night shift sessions were offered. Certificates of Attendance were provided to all participants and were considered as credit toward the Career Ladders at both hospitals. Attendance at the program counted as the yearly mandatory in-service for restraint care at both hospitals.

Those subjects who agreed to participate were, in general, highly motivated nurses who appreciated the importance of research. Many of the participants were also students pursuing further education. It was very difficult to free nurses long enough from

patient care due to the shortage in staffing levels. Many nurses reported to work early or remained after work to participate. Some nurses in the computer group were allowed to participate remotely. Being able to participate at home helped to achieve the higher number of subjects in the computer group.

Another major barrier occurred at the beginning of the developmental phase of the computer module. The selection of a software platform was a critical decision. Several experts in educational software were consulted and a review of the literature was conducted. One software product was identified as having the capability to maintain eLearning content in the format required for this study and provide easy quizzing and scoring through an assessment tool. One of the study sites had an older version of the software; however, the organization did not have funds available to upgrade to the version with the assessment tool. A local university had the desired software and was willing to explore an interface; however, an interface was not possible due to firewall issues at the hospitals. The other complication was that the study data would be difficult to retrieve from hospital data. Through discussions with the IT departments at all three organizations (the hospitals and the university) over a few months, it was decided that the best solution was a web-based module. The major limitation of the web-based software was that the pretests and posttests could not automatically be linked to the individual subjects. That problem was addressed later during data analysis by matching the dates and times on the computers that the subjects accessed the module on the Web by computer. It would have been easier to manually assign code numbers at the beginning of the sessions. The advantage for subjects of the web-based modules was the easy access through the internet. Access to the hospitals' mainframe computers was



unnecessary. Another problem avoided was retrieving the study data from the total data in the hospital systems.

### **Limitations of Study**

Although the results of the study were not statistically significant, differences between the two treatments may have been missed due to the small sample size. There were twice as many subjects in the computer group than the didactic group. The sample size was smaller than originally planned.

Another limiting factor was the topic. During the design of the study, the hospitals were asked for topic suggestions. The goal was to assist the hospitals in their training needs in exchange for supporting the study. Both hospitals selected patient restraint management as the preferred topic. It was interesting to note that the study participants indicated that restraint care was a major concern at both hospitals and that more education to hospital staff was needed. Although the topic met the needs of the hospitals, policies and procedures differed somewhat between the 2 hospitals; therefore, two different modules and didactic scripts had to be developed. The researcher had less control of content and assessment was more challenging because important content that varied between hospitals could not be included in the pretests and posttests. The pretests and posttests had to test generic content common to both hospitals. It was very difficult to find validated questions on new evidenced-based content on safe restraint care because of slight variations in the implementation of new evidence in clinical practice at the 2 hospitals. Although the pretests and posttests contained questions that tested general knowledge regarding restraints, the subjects were probably less challenged than if they had been tested on more of the new content in the instructional sessions. This is

supported by the fact that so many subjects commented that they learned a great deal from the sessions. The differences between the two hospitals and their management of restraints created problems with assessment validity. Since the majority of the subjects were well-educated and experienced, the content tested was more familiar to them. The results might have been different if questions on the pretests and posttests had been different.

Every attempt was made to keep the content consistent between the computer and didactic sessions; however, during a couple of didactic sessions, hospital equipment problems prevented the use of the lecture power points. The frustration about technical problems and time delays could have affected lecture content and learning outcomes.

Nurses are normally distracted when they leave the nursing units and leave their patients to attend in-service education and training programs. When staffing levels are low and patient acuity is high, nurses are even less engaged in instructional sessions because of their concern for their patients. Lack of engagement could have had an effect on how well they attended to the content being presented. In both hospitals the nurses expressed concern about being away from the units for an hour. Staffing levels did not allow for adequate monitoring of their patients in their absence.

### **Conclusions**

As stated in Chapter III, the goal was to achieve 80% power to detect a medium effect size. The goal of  $n = 64$  in each study group was not achieved for reasons already cited. The small sample size reduced the power of the study. However, although the sample size was small, the study results indicated one significant difference between the didactic and computer groups. The didactic group had a significantly higher increase in

knowledge scores on the posttest than the computer group. The power analysis on this result indicated a small effect size of  $d = 0.29$ , which could indicate that a difference did not actually exist between the two groups.

Although the didactic instruction was scripted and every effort was made to avoid questions, subjects sought clarification of content and shared clinical experiences with their colleagues. This interaction is common in the traditional classroom and contributes greatly to learning. Nursing is a profession that values interpersonal interaction and although nurses complain about the inconvenience of didactic in-services, they may learn best in that environment. It is likely that the conversations that occurred during the didactic sessions contributed to the participants' understanding of the content and knowledge acquisition. When nurses hear from other nurses how they have modified clinical practice according to new evidence, change in practice is less threatening.

The fact that the results did not indicate a significant difference in critical thinking/situational understanding and overall competency between the two groups is consistent with some of the studies mentioned in Chapter II (Alemán, et al, 2011; Bekele, 2009; Bloomfield, et al, 2010; Tsai, Tsai, et al, 2004; Wang et al, 2009). These results could be interpreted to support the idea that adult learners differ in learning preferences and that we are in the midst of a training and education transformation. Educators are challenged by the different learning preferences of the different generations and their preferred learning tools. This study demonstrates that both methods are effective methods of instruction. One might conclude that if both methods contribute similarly to staff nurse competency, electronic simulation could be an instructional method of choice because it is more convenient for staff nurses, less resource intensive, and may be less

expensive to organizations. The results of this study should not discourage the use of vignette-based computer simulations. Instead, the results indicate that vignette-based computer simulations are worthy of further exploration as an effective method of instruction. In light of this and other studies cited, however, shifting to computer based education without considering the valuable learning that occurs in nursing through the classroom experience will likely limit the opportunities to achieve optimal patient care outcomes.

Although the results do not support the hypotheses, more differences between the two treatments could exist and could have been missed due to the small sample size. The difference between the two groups in knowledge scores is noteworthy and deserves further investigation regarding the preference of nurses for face to face interaction, even if less convenient. Nurses may prefer the electronic training modules because they can get through the in-services more quickly, but they do not get as engaged in content as much as they do in the didactic sessions. This study, therefore, suggests that more hybrid or blended learning methods should be considered. Blended learning or hybrid courses combine face-to-face and online teaching-learning methods. According to Katai and Toth (2010), the study of relatively new or rediscovered teaching-learning concepts like blended, hybrid, multi-sensory, or technologically enhanced learning has increased. Research has demonstrated that many scientific domains, such as nursing, deal with abstract concepts that are difficult for students to comprehend (Katai & Toth, 2010). Katai and Toth (2010) concluded that the effectiveness of the blended teaching-learning strategy is based on the benefits of multi-sensory input (different students with different dominant senses/intelligences/learning style), whole-body-learning, and dual coding

(distributed cognitive load). Li-Ling Hsu (2011) studied students' satisfaction and attitudes, the relationship between students' satisfaction ratings of a nursing ethics course, and their attitudes in the blended learning environment. Statistically significant correlations were found between students' satisfaction with blended learning and case analysis attitudes. The study also suggested that the blended or mixed method of instruction has the potential to bridge the gap between students and instructors and between students and their peers. The author concluded that meaningful learning can be created by employing blended pedagogy in course design. The use of blended or hybrid instructional method is thought to promote critical analysis and problem solving skills through active learning and social exchange of ideas (Amaral & Shank, 2010, Cottle & Glover, 2011, Hsu, 2011, Thor, 2010).

The reliability coefficients of pretests and posttest items were low to moderate as evidenced by Cronbach's  $\alpha$ . As described in Chapter III, every effort was made to find validated questions for the pretests and posttests; however, it was difficult to find questions that covered new evidenced-based research because of the differences in practice in the two hospitals.

The subjects reported that the computer module was informative and easy to navigate. Many commented that the scenarios were relevant to their practice and, as a result of scenario feedback, they plan to change their clinical practice. Subjects in the didactic sessions commented that they learned new information that will change their practice, as was validated by the increase in knowledge scores in the didactic group.

## **Recommendations**

This study tested the hypotheses that computer interactive simulation was more effective as an instructional methodology than traditional classroom instruction in educating staff nurses about the safe management of patients in restraints. Although the results did not validate that computer simulation increases overall competency, use of this technology is not likely to decrease. In fact, technology in education is advancing at a rapid rate and it is likely that educators will continue to explore new instructional modalities. It is critical that the benefits of computer interactive simulation be maximized; however, the benefits of traditional classroom instruction in nursing should not be ignored. Nurses by nature are oriented toward interpersonal interaction and learn from each other. This study opens the discussions regarding the importance of further research. The limitations and barriers to this study are important to further research.

Among the obvious recommendations is to have a larger sample size. This might be obtained by using a different topic that is of greater interest to staff nurses. Depending on the size of the organization, conducting the study in one organization could limit the sample size; however, some of the other problems such as differences in practice policies and procedures would be avoided. If the topic was less tied to hospital policies and procedures and more generic to practice, utilizing more than one organization would be plausible.

It is recommended that the topic be chosen with assessment in mind. Using questions with more internal consistency is recommended for better results. Once the content is developed, it is recommended that the researcher use questions that focus on the information that is least familiar to the subjects. In this study, the computer scenarios

were current, closely related to clinical practice, and the questions asked following the scenarios were teaching moments. In future studies, however, it is recommended that the pretests and posttests contain questions that test more directly whether the subject's critical thinking/situational understanding and knowledge increased as a result of the scenarios and the feedback to subject responses.

Finally, although the study did not find statistical significance, a great deal was learned during the process of doing the study. The fact that the study was a doctoral dissertation being conducted by an "outsider" to the organizations may have limited participation. When replicating this study, it is recommended that the study be conducted jointly with an internal researcher who has both credibility and, at least, informal power within the organization. It would be ideal if the study could be a joint venture between the researcher and the hospital and, perhaps, supported by a grant. If monies were available, perhaps a small stipend could be given to participants. The leaders must view some benefit to their organizations, either qualitatively or financially when asked to commit resources to any study of this kind.

The clinical environment is changing so rapidly that it is unreasonable for nurses to depend on practice decisions that have been successful in the past. As mentioned in Chapter II, the complacency of nurses to learn and change their practice as a result of evidence-based research is a major challenge to nurse educators. Although healthcare organizations have become centers of education, the focus tends to be on technical skills, equipment management, and regulations rather than clinical problem solving. A new learning environment is needed that promotes greater understanding of clinical situations, creativity, and high level decision- making. Learning environments that present

simulated real-life clinical dilemmas do not focus just on facts or technical skills, but represent thinking and problem-solving skills needed for the future. Nursing is a high stakes profession. Nurses integrate their knowledge and skills according to particular patient care concerns, demands, resources, and constraints; therefore, reasoning through a particular patient's condition and situation is a core skill for nurses (Benner, 2010). The ability to recognize changes in a situation, quickly understand the situation, and take the best action is the hallmark of an expert clinician. Johnson and Webber (2010) describe the competent nurse as one who has deepened their knowledge, skills, values, and experiences related to nursing, which influences their clinical reasoning and decision making. The need to identify and test instructional methods that enhance clinical judgment necessitates further research. It is recommended that additional research on instructional methods include studies such as this on nursing students. All nursing educators will benefit from greater insights as to the effectiveness of various teaching methods designed to increase clinical competency.



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## APPENDICES

## Appendix A

### Informed Consent Statement: Hospital A

Approved by the Human Subjects Committee University of Kansas,  
Lawrence Campus (HSCL). Approval expires one year from 3/10/2010.  
HSCL #18549

## INFORMED CONSENT STATEMENT

### NAME OF STUDY

#### **THE EFFECT OF COMPUTER INTERACTIVE SIMULATION ON SITUATIONAL DECISION-MAKING AND COMPETENCY DEVELOPMENT OF EXPERIENCED STAFF NURSES**

### INTRODUCTION

The Department of Curriculum and Teaching: School of Education at the University of Kansas and the Department of Nursing: [REDACTED] support the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You may refuse to sign this form and not participate in this study. You should be aware that even if you agree to participate, you are free to withdraw at any time. If you do withdraw from this study, it will not affect your relationship with these units, the services they may provide to you, the University of Kansas, or [REDACTED].

### PURPOSE OF THE STUDY

The purpose of this study is to test whether computer interactional simulation is more effective as an instructional methodology than the traditional classroom setting in promoting clinical competency in experienced staff nurses. This study is designed to evaluate the effects of simulation on knowledge development and improved situational understanding/critical thinking (decision making skills) related to the safe management of patients requiring restraints.

### PROCEDURES

You will be randomly assigned to either a control group or a treatment group. If you are assigned to a control group, you will receive the classroom instruction on patient restraint care. If you are assigned to the treatment group, you will receive the same content as the control group on the computer. Although some content will be review, you will be evaluated as to your competency and ability to integrate old and new knowledge into clinical practice. Content related to the new standards for restraint care will be new to all participants. You will be asked to complete a pretest and a posttest.

Each participant will be asked to commit no more than 60 minutes for instructional time and pretest and posttest completion.

The names of all subjects will be replaced with code numbers by the Director of Nursing Education or designee, only the code numbers appear on all the data and all data will be used by the researchers only and retained in the researchers locked files. The signed consent forms will be retained by the primary researcher in a locked file.

## **RISKS**

There are no known risks anticipated to the participants of this study.

## **BENEFITS**

Nurses are highly stressed in today's healthcare environment and mandatory in-services are seen as disruptive. Motivation to attend and change practice is a common problem. Curriculum should be interesting, stimulating to the experienced practitioner, and relevant to practice. Healthcare has become more and more complex especially in acute care settings. Finding innovative teaching strategies that help educate nurses to provide safe patient care in the context of such complexity is the focus of this study.

## **PAYMENT TO PARTICIPANTS**

No additional payment will be made to participants for participating in this study.

## **PARTICIPANT CONFIDENTIALITY**

Your name will not be associated in any way with the information collected about you or with the research findings from this study. The researchers will use a study number instead of your name. The researchers will not share information about you unless required by law or unless you give written permission.

## **REFUSAL TO SIGN CONSENT AND AUTHORIZATION**

You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or [REDACTED] or to participate in any programs or events of the University of Kansas or [REDACTED]. However, if you refuse to sign, you cannot participate in this study.

## **CANCELLING THIS CONSENT AND AUTHORIZATION**

You may withdraw your consent to participate in this study at any time. You also have the right to cancel your permission to use and disclose information collected about you, in writing, at any time, by sending your written request to:

Bonnie L. Peterson, Research Investigator  
Petro 203 K  
1700 SW College Avenue  
Topeka, Kansas 66621-1117

If you cancel permission to use your information, the researchers will stop collecting additional information about you. However, the research team may use and disclose information that was gathered before they received your cancellation, as described above.

#### QUESTIONS ABOUT PARTICIPATION

Questions about procedures should be directed to the researchers listed at the end of this consent form.

#### PARTICIPANT CERTIFICATION:

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study. I understand that if I have any additional questions about my rights as a research participant, I may call (785) 864-7429 or (785) 864-7385, write the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, or email [mdenning@ku.edu](mailto:mdenning@ku.edu).

I agree to take part in this study as a research participant. By my signature I affirm that I have received a copy of this Consent and Authorization form.

_____ Type/Print Participant's Name	_____ Date
_____ Participant's Signature	

#### Researcher Contact Information

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Code # \_\_\_\_\_

## Appendix B

### Informed Consent Statement: Hospital B

Approved by the Human Subjects Committee University of Kansas,  
Lawrence Campus (HSCL). Approval expires one year from 3/10/2010.  
HSCL #18549

## INFORMED CONSENT STATEMENT

### NAME OF STUDY

### **THE EFFECT OF COMPUTER INTERACTIVE SIMULATION ON SITUATIONAL DECISION-MAKING AND COMPETENCY DEVELOPMENT OF EXPERIENCED STAFF NURSES**

### INTRODUCTION

The Department of Curriculum and Teaching: School of Education at the University of Kansas and the Department of Nursing: [REDACTED] support the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You may refuse to sign this form and not participate in this study. You should be aware that even if you agree to participate, you are free to withdraw at any time. If you do withdraw from this study, it will not affect your relationship with these units, the services they may provide to you, the University of Kansas, or [REDACTED].

### PURPOSE OF THE STUDY

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Each participant will be asked to commit no more than 60 minutes for instructional time and pretest and posttest completion.

The names of all subjects will be replaced with code numbers by the Director of Nursing Education or designee, only the code numbers appear on all the data and all data will be used by the researchers only and retained in the researchers locked files. The signed consent forms will be retained by the primary researcher in a locked file.

## RISKS

There are no known risks anticipated to the participants of this study.

## BENEFITS

Nurses are highly stressed in today's healthcare environment and mandatory in-services are seen as disruptive. Motivation to attend and change practice is a common problem. Curriculum should be interesting, stimulating to the experienced practitioner, and relevant to practice. Healthcare has become more and more complex especially in acute care settings. Finding innovative teaching strategies that help educate nurses to provide safe patient care in the context of such complexity is the focus of this study.

## PAYMENT TO PARTICIPANTS

No additional payment will be made to participants for participating in this study.

## PARTICIPANT CONFIDENTIALITY

Your name will not be associated in any way with the information collected about you or with the research findings from this study. The researchers will use a study number instead of your name. The researchers will not share information about you unless required by law or unless you give written permission.

## REFUSAL TO SIGN CONSENT AND AUTHORIZATION

You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or [REDACTED] or to participate in any programs or events of the University of Kansas or [REDACTED]. However, if you refuse to sign, you cannot participate in this study.

## CANCELLING THIS CONSENT AND AUTHORIZATION

You may withdraw your consent to participate in this study at any time. You also have the right to cancel your permission to use and disclose information collected about you, in writing, at any time, by sending your written request to:

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I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study. I understand that if I have any additional questions about my rights as a research participant, I may call (785) 864-7429 or (785) 864-7385, write the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, or email [mdenning@ku.edu](mailto:mdenning@ku.edu).

I agree to take part in this study as a research participant. By my signature I affirm that I have received a copy of this Consent and Authorization form.

---

Type/Print Participant's Name

---

Date

---

Participant's Signature

## Researcher Contact Information

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## Appendix C

### Demographics Questionnaire

## Demographics Questionnaire

### 1. Age

- ☐ Under 22
- ☐ 22 – 29
- ☐ 30 – 39
- ☐ 40 – 49
- ☐ 50 – 59
- ☐ 60 – 69
- ☐ 70 and over

### 2. Gender

- ☐ Female
- ☐ Male

### 3. To which **racial or ethnic group** do you *most* identify?

(Note: categories are defined by the federal government).

- ☐ African-American (Non-Hispanic)
- ☐ Asian/Pacific Islanders
- ☐ Caucasian (non Hispanic)
- ☐ Latino or Hispanic
- ☐ Native American, Aleut or Aboriginal Peoples
- ☐ Other

### 4. How long have you been employed as an RN?

- ☐ Less than 1 year
- ☐ 1-4 years
- ☐ 5-10 years
- ☐ 11-14 years
- ☐ 15 years or greater

### 5. Your highest **degree earned**:

- ☐ Associate's Degree in Nursing
- ☐ Diploma in Nursing
- ☐ Bachelor's Degree in Nursing
- ☐ Bachelor's Degree in Other
- ☐ Master's Degree in Nursing
- ☐ Master's Degree in Other
- ☐ Ph.D. in Nursing
- ☐ Ph.D./Doctorate in other; What degree? \_\_\_\_\_

### 6. How long have you been using the computer for online education?

- ☐ Never used it
- ☐ Less than 6 months
- ☐ 6- 11 months
- ☐ 1- 3 years
- ☐ 4- 6 years
- ☐ 7 years or more

### 7. When was the last time you completed an educational program on restraint care?

- ☐ Less than 1 month
- ☐ 1- 3 months

- \_\_\_\_ 4- 6 months
- \_\_\_\_ 7- 9 months
- \_\_\_\_ 10- 12 months
- \_\_\_\_ 13 months or more

8. Please indicate whether you are regularly scheduled for an

- \_\_\_\_ 8 hour shift
- \_\_\_\_ 12 hour shift.
- Other: \_\_\_\_hours

9. Approximately, how much time do you spend using the computer during your shift?

- \_\_\_\_ hours
- \_\_\_\_ minutes

## Appendix D

### Study Pretest

#### Pre Test

#1 The nurse's major goal for a patient who is at risk for injury is to:

- ☐ Assess the patient's mental status
- ☐ Keep the patient dependent on the staff for all care
- ☐ Make all choices for the patient
- ☐ Remain free from injury

#2 Which of the following interventions would help prevent falls in the elderly patient?

- ☐ Place socks on feet
- ☐ Exercise regularly
- ☐ Restrain at night by tucking in the top sheets
- ☐ Turn the light on after getting out of bed

#3 Which of the following charges could be brought against the nurse if the nurse were to restrain the patient against his or her will?

- ☐ Defamation of character
- ☐ Assault and battery
- ☐ Negligence
- ☐ Slander

#4 When applying restraints on a patient, the nurse would secure a doctor's order and

- ☐ Assess the restraints every 10 minutes
- ☐ Pad bony prominences
- ☐ Secure the restraint to the side rail
- ☐ Tie the restraint with a square knot

#5 An 86 year-year-old patient with Alzheimer's disease continually tries to get out of bed at night. Which alternative safety measure should the staff choose to use with this patient?

- ☐ Orient the patient to her surroundings
- ☐ Place the patient in a bed net
- ☐ Use relaxation techniques

- ☐ Explain all procedures and treatments
- ☐ Place a bed safety monitoring device on the bed

#6 There is a very confused patient on the unit and she is wandering. Which of the following alternatives to using a restraint would be most appropriate to use with this patient?

- ☐ Move this patient to the farthest room from the nurses' station
- ☐ Place a rocking chair in her room
- ☐ Pull up all the side rails on the bed
- ☐ Wedge pillows against the side rails on the bed

#7 Which of the following desired outcomes/goals would be appropriate for an elderly patient in preventing injury?

- ☐ The patient will demonstrate an understanding of all limitations
- ☐ The patient will establish a buddy system
- ☐ The patient will make uninformed choices when addressing health issues
- ☐ The patient will take his medication as desired

#8 Which of the following steps helps to promote a safe environment for the patient?

- ☐ Keep clutter to a minimum in the patient's room
- ☐ Have the patient wear terry cloth slippers
- ☐ Provide adequate lighting
- ☐ Turn off alarms to reduce noise

#9 Which of the following is an incorrect part of the nursing assessment before applying restraints on a client?

- ☐ Status of skin to which restraint is to be applied
- ☐ Circulatory status proximal to restraint
- ☐ Consideration of other protective measures that may be implemented before applying a restraint
- ☐ Underlying cause for assessed behavior

#10 \_\_\_\_\_ restraints are any manual method, mechanical device, material, or equipment attached to the patient's body: that cannot be removed easily and restrict the client's movement.

- ☐ Chemical
- ☐ Physical
- ☐ Medical
- ☐ Standard

#11 Which criteria should the nurse use when selecting a restraint? (check all that apply)

- ☐ Mobility restrictions
- ☐ Level of consciousness
- ☐ Behavior
- ☐ Agency policy
- ☐ Patient condition (circulation)

#12 After a patient has a seizure, which action can you delegate to the nursing assistant?

- ☐ Document the seizure
- ☐ Perform neurological checks
- ☐ Take the patient's vital signs
- ☐ Restrain the patient for protection

#13 A health care provider verbally directs you to restrain a patient due to family request and a history of falls. You request a written order, but he declines because "it may be temporary and I want to keep the family happy." What is the best approach in dealing with this situation?

- ☐ Assess the patient for risk of falling and discuss your findings and concerns with the provider
- ☐ Refuse to follow the verbal order because you are violating the patient's rights if you do not have a written order
- ☐ Recognize that listening to family concerns is an important part providing for the safety of the patient
- ☐ Document the situation, place the patient in a chair with a secure lap board, and continue to care for her to the best of your ability

#14 You are reviewing the principle of "least restrictive" intervention with the nursing student. Place the following interventions in the correct ascending order from the least restrictive to the most restrictive. (Mark one item per number)

	1 - Least Restrictive	2	3	4	5 - Most Restrictive
Restrain the patient's arms and legs with soft cloth restraints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verbally instruct the patient to stop the undesirable behavior (i.e., pulling on IV lines)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Move the patient close to the Nurse's Station to observe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Restrain the patient's upper extremities with wrist restraints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Place the patient in a private room with a nursing assistant observing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#15 Physical hazards associated with restraint use include: (check all that apply)

- ☐ Impaired skin integrity
- ☐ Fall or other injury
- ☐ Respiratory distress
- ☐ Circulatory problems
- ☐ Compromised nutrition or hydration
- ☐ Strangulation or death

#16 Choose behaviors listed that indicate a patient might be ready to be released from restraint:

- ☐ A. Ability to follow and comply with simple directions
- ☐ B. Benefiting from use of medication
- ☐ C. Willingness to use staff redirection
- ☐ A & C
- ☐ A, B, & C

#17 Maintaining a patient's dignity and privacy while in restraints and/or seclusion includes which of the following: (check all that apply)

- ☐ Covering the patient with a sheet while toileting
- ☐ Having a staff member of the same sex assist with personal hygiene
- ☐ Offering them a blanket, if clinically appropriate

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## Appendix E

### Study Posttest

#### Post Test

#1 The nurse's major goal for a patient who is at risk for injury is to:

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- ☐ Fall or other injury
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- ☐ Offering them a blanket, if clinically appropriate

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## Appendix F

### Access Links to Computerized Instructional Modules

<b>Instructional Modules</b>	<b>Link for Access</b>
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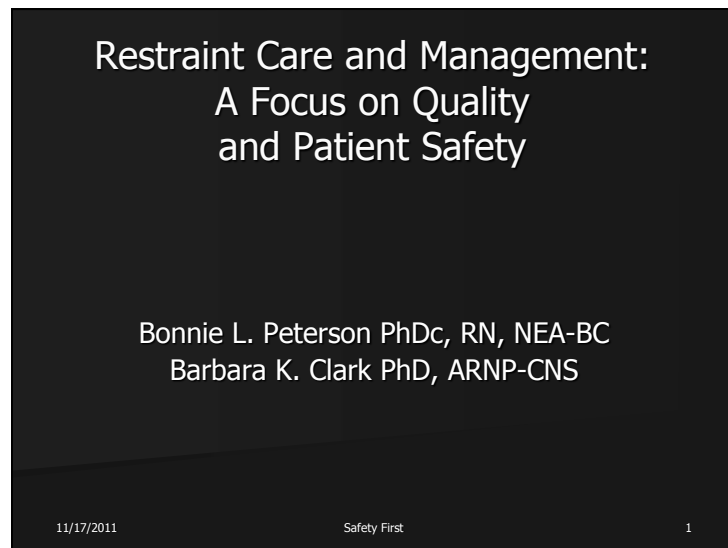
	<a href="http://washburn.edu/iss/tlc/RCAM/StormontVail.htm">http://washburn.edu/iss/tlc/RCAM/StormontVail.htm</a>
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	<a href="http://washburn.edu/iss/tlc/RCAM/StFrancis.htm">http://washburn.edu/iss/tlc/RCAM/StFrancis.htm</a>
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## Appendix G

### Didactic Lecture Script for Hospital A

#### Slide 1

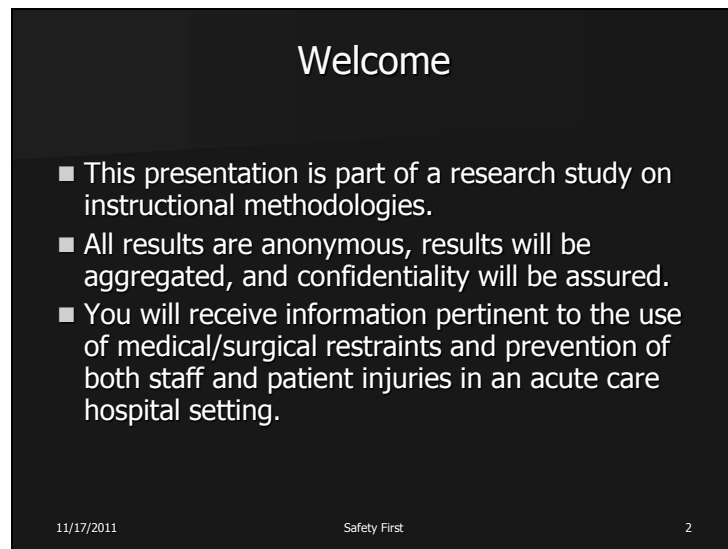


Greetings. Thank you for participating in this training session. You have been randomly selected to this experimental group of subjects . Other subjects are experiencing a different instructional methodology of the same content. Please be sure to sign your name on the participant list in order to receive your **Certificate of Participation**. In no way will your name be linked to the results of the study. All individual results are strictly confidential.

There are two documents that you need to complete to participate in the study: **The Consent to Participate** in the Study, which you all should have already signed, and the **Demographic Survey** at your seat. Please take a moment now to complete the Demographic Survey so we have some important information about the subjects in the study. This information will be aggregated and, again, will not be connected to any particular participant.

Once you have completed the survey, please raise your hand and I will collect it. **Remember: Please complete the Post Test before you leave.** Refreshments are available in the next classroom. I hope you enjoy this experience. Your Certificates will be sent to you soon. Thank you!

## Slide 2



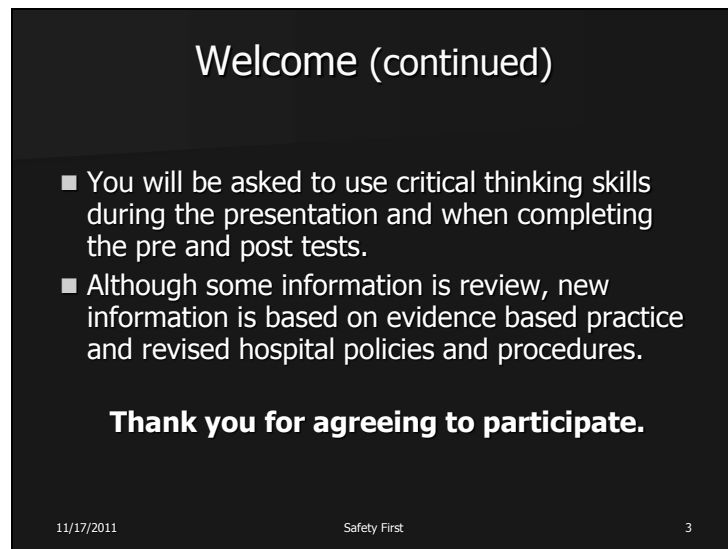
### Welcome

- This presentation is part of a research study on instructional methodologies.
- All results are anonymous, results will be aggregated, and confidentiality will be assured.
- You will receive information pertinent to the use of medical/surgical restraints and prevention of both staff and patient injuries in an acute care hospital setting.

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Read Slide

### Slide 3



Welcome (continued)

- You will be asked to use critical thinking skills during the presentation and when completing the pre and post tests.
- Although some information is review, new information is based on evidence based practice and revised hospital policies and procedures.

**Thank you for agreeing to participate.**

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Read Slide



Slide 4



Slide 5

Introduction

Nurses are the leaders in creating the  
culture of safety in the acute care  
setting.

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Read Slide

Slide 6

Overview of quality  
and safe patient care

The American Nurses Association  
Standards of Practice (ANA, 2004)  
set the expectation that registered nurses  
employ strategies to maintain patient  
safety.

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Read Slide

## Slide 7

### Overview of quality and safe patient care (continued)

- In 2001 the IOM published “Crossing the Quality Chasm” which provided guidelines for care delivery redesign. Six aims were cited which must be addressed through process and quality improvements:
  - Timely
  - Effective
  - Efficient
  - Patient-Centered
  - Safe
  - Equitable

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Read Slide

## Slide 8

Overview of quality and safe patient care (continued)

- The Institute of Medicine (IOM) described the nation's healthcare system as **fractured, prone to errors, and detrimental to safe patient care** (IOM, 2000).
- The **#1** recommendation for reducing risks to patient safety according to the Federal Drug Administration is **ORIENTATION AND TRAINING FOR STAFF!!!**

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## Read Slide

### Instructor Notes

Orientation and Training for staff is often not enough if staff do not change their practice as a result of evidence. Most of the time we tend to continue doing what we have always done.

### Critical Thinking for Patient Safety

- Safe patient care is based on the nurse's critical thinking skills and must include:
  - Knowledge from nursing and other scientific disciplines
  - Assessments of patient and family
  - Previous experiences in caring for patients and families
  - Attitudes and values such as perseverance, beneficence and autonomy
  - Standards of practice and policies (organizational, CMS, TJC, and AJN).

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In order to be a safe practitioner, the skills of critical thinking must include the KNOWLEDGE of nursing and other scientific disciplines, assessments, previous experiences, ethical principles, and standards of practice and policies.

### Patient Safety and Critical Thinking (continued)

- Clinical judgments require nurses to:
  - Anticipate necessary information
  - Analyze the data
  - Make decisions regarding care.
- Critical Thinking is ongoing.
- Learning goal: apply critical thinking to the issue of safety and patient restraints.

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Clinical judgments require nurses to anticipate necessary information, analyze the data and make decisions regarding care. Critical thinking is a life long process. The learning goal of this session is to apply knowledge and critical thinking skills to the safe use of patient restraints. That means becoming COMPETENT in the use of restraints.

Definition:  
"Restraint Episode"

- The time period from initiation of restraint/seclusion until release of restraint/seclusion is considered the "restraint episode".

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The definition of a "restraint episode" is the time period from initiation of restraint/seclusion until the release of the restraint.



## Slide 12

Definition: "Restraint"

- Restraint is any manual method and/or physical or mechanical device, material, or equipment attached or adjacent to the patient's body that:
  - the patient cannot remove
  - restricts freedom of movement, physical activity, or normal access to one's body
  - voluntary or involuntary.

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## Read Slide

## Slide 13

Definition:  
"Restraint" (continued)

- Seclusion:
  - Confinement in a room or area where patient is physically prevented from leaving
  - Voluntary or involuntary
  - Used in an emergency to protect patient or others from harm
  - Used only when other less restrictive measures are ineffective.

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Read Slide

## Slide 14

Definition:  
"Restraint" (continued)

- Chemical Restraint:  
Medications, if used to restrict freedom of movement or control of behavior and not a usual part of patient's standard of care and treatment, are considered "restraints" (TJC, 2006).

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## Read Slide

Definition:  
"Restraint" (continued)

- Restraint" is **NOT**:
  - Orthopedically prescribed devices
  - Surgical dressings/bandages
  - Protective helmets
  - Use of 4 side rails when it is necessary to keep a patient safe (transport, seizure precautions, anesthesia recovery)
  - Holding for examinations/testing/activities to prevent harm.

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Here are the exceptions to the restraint definition: Read Slide

## Use of Restraints

- Restraints present a specific challenge to patient care:
  - Rationale for use of restraints
  - Types of restraints and indication for use
  - Application of restraints
  - Staff Safety
  - Strategies for avoiding restraints
  - Legal issues
  - Ethical issues
  - Documentation

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The challenges that restraints present to patient care are having the right rationale for using restraints, selecting the right restraint, knowing how to apply restraints correctly, using safe body mechanics and having adequate help when applying restraints, and knowing the alternatives to restraints, the legal issues, ethical issues, and rules for documentation.

### Use of Restraints (continued)

- The Joint Commission provides safety standards for use of restraints and the role of nursing in safety management (2006).
- The Center for Medicaid and Medicare Services (CMS, 2006) published provisions on use of restraint and seclusion for all Medicare- and Medicaid-participating hospitals.

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The Joint Commission and the Center for Medicaid and Medicare Services have specific standards for the use of restraint and seclusion. Any complaints and violations are considered serious and follow up is closely monitored.

### Purpose of "Restraint"

- Goal: to directly support medical healing.
- Exceptions to Restraint Policy:
  - Patients restrained by corrections authorities for security purposes
  - Protective equipment such as helmets
  - Adaptive support in response to assessed physical needs of patients (postural support or orthopedic appliances)
  - Standard practices to conduct tests, procedures, and post-procedural care.

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The purpose of a restraint in medical/surgical areas is directed at the goal to directly support medical healing. The exceptions to the restraint policy are listed here: Read Slide

### Indications for Restraint

- Restraint/seclusion is indicated in the following situations:
  - Other less restrictive measures have been ineffective to protect the patient or others
  - Behavior in crisis becomes aggressive or violent and presents an immediate danger to self or others
  - Restraint is based on behavior and not restricted to certain departments
  - Use of restraint is not based on patient history alone.

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In the broad sense, restraint/seclusion is indicated in the situations listed. Read Slide



### Indications for Restraints (continued)

- Restraint/seclusion is indicated in the following situations: (continued)
  - The patient's healing process is threatened significantly or disrupted (restraints only)
  - Restraint standards apply when adaptive devices are used for both support and/or restraint only.

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Restraint/Seclusion **IS** indicated in the situations listed. Read Slide

### Pre-Application Assessments

- Upon ADMISSION consider possible threats to patient and staff safety, including immediate environment, and individual risk factors.
- Nursing History:
  - Level of wellness: any underlying conditions that pose threats to safety (gait, muscle strength, coordination, balance, vision)
  - Medications or procedures that pose threats (diuretics increase urinary frequency).

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The key here is the assessment upon admission. Consider any possible threat to patient and staff safety. Including the immediate environment and individual risk. The Nursing Assessment includes any underlying condition that poses a threat to safety, such as those listed, medications, or procedures.

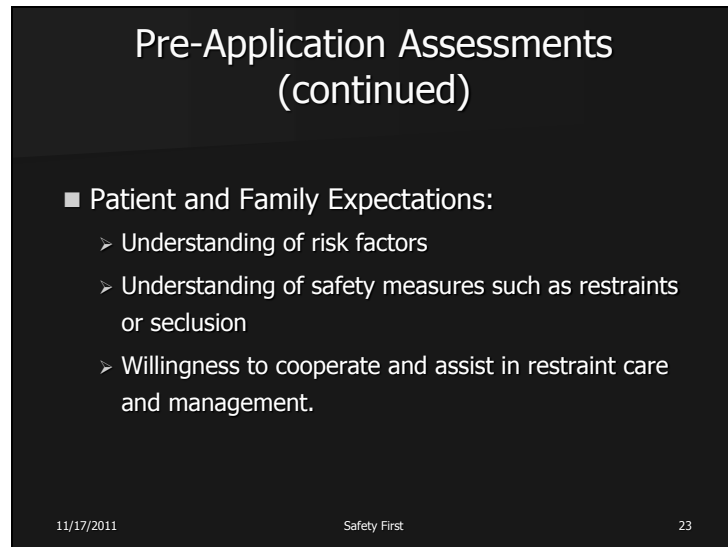
### Pre-Application Assessments (continued)

Risk for Falls:

- History of falls
- Fall assessment tool if appropriate
- Initial and daily fall risk assessment necessary
- Family consultation regarding history and fall risk factors.

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Many patients are determined a “fall risk” because of the history of falls. Use of a fall assessment tool and consultation with the patient’s family can determine to what degree the patient is at risk. The goal is to prevent falls!

A presentation slide with a dark blue background and white text. The title 'Pre-Application Assessments (continued)' is at the top. Below it is a section header '■ Patient and Family Expectations:' followed by three bullet points. At the bottom, there is a date '11/17/2011', the text 'Safety First', and the number '23'.

## Pre-Application Assessments (continued)

- Patient and Family Expectations:
  - Understanding of risk factors
  - Understanding of safety measures such as restraints or seclusion
  - Willingness to cooperate and assist in restraint care and management.

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The cooperation and partnership with the patient and family can be a key factor in assuring the patient's safety. Expectations can vary so making sure there is a level of understanding of restraint care is critical. If families do not understand the risks, they can seriously compromise the patient's safety.

### Planning and Interventions: Seek Alternatives First

- Alternatives to Restraints:
  - Answer lights promptly
  - Close observation; move patient close to nurse's station
  - Attention to fall prevention at night and while walking with caregiver
  - Utilize modern equipment to eliminate falls (bed exit system, Ambularm, infrared technology, voice activated systems, and bed alarms)

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There are many alternatives to restraints that can reduce or eliminate the need for restraints such as those listed. Modifications of the environment as an alternative to using restraints are consistent with the trend toward health promotion, safety, and emphasis on improved assessment techniques.

#### Instructor Notes

Modern equipment such as **Ambularm** on the leg is a good example. It signals when the leg is in a dependent position, such as over the side rail or on the floor. Other examples are the Bed-Check bed exit alarm system. This device sounds an audible alarm at the bedside when the body weight pressure is released off the sensor mat placed on patients' beds or chairs. Alarms can be designed to signal at the central nurses' station when patients get up or out of bed. Door alarms, Posey Bed All Care Model and side rails are viewed as less restrictive restraints. Some alarms are set with familiar voices such as a family member to "do not get out of bed, Dad."

**Planning and Interventions:  
Seek Alternatives First (continued)**

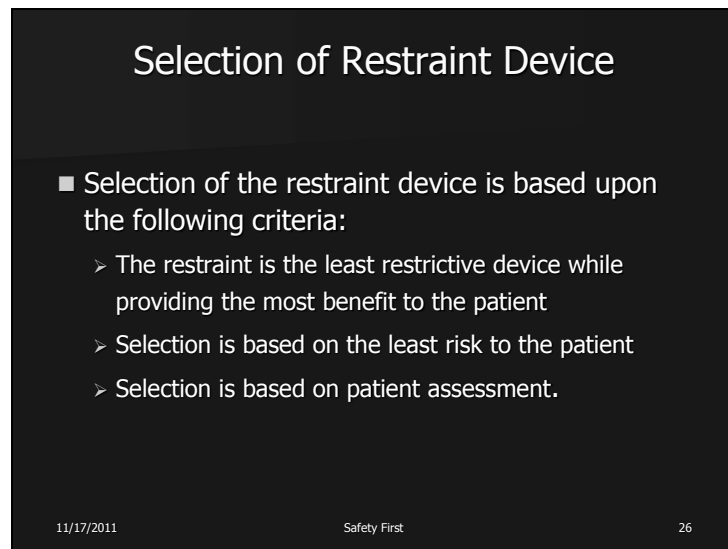
**Alternatives to Restraints ( continued)**

- Rubber-soled shoes or slippers
- Fixed night lights, bed height, location of bathroom, bathroom lighting, stable furniture, and hand bars
- Family or others as sitters
- Remove excess furniture and equipment
- Physical activity (rocking chair).

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Here are some other alternatives, some of which serve as distracters and/or help reduce anxiety. Nighttime is especially risky for falls. Read Slide

## Slide 26



The slide is titled "Selection of Restraint Device" in white text on a dark background. Below the title, there is a bulleted list of criteria for selecting a restraint device. The list starts with a square bullet point followed by the text "Selection of the restraint device is based upon the following criteria:". This is followed by three right-pointing arrow bullet points, each describing a criterion: "The restraint is the least restrictive device while providing the most benefit to the patient", "Selection is based on the least risk to the patient", and "Selection is based on patient assessment.".

Selection of Restraint Device

- Selection of the restraint device is based upon the following criteria:
  - The restraint is the least restrictive device while providing the most benefit to the patient
  - Selection is based on the least risk to the patient
  - Selection is based on patient assessment.

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## Read Slide

## Restraints: Mitten

- Mitten restraint:  
Thumbless mitten device to restrain client's hands.
- Place hand in mitten, being sure to bring end up over the wrist.



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Read Slide


### Instructor Notes

A mitt or hand restraint is used to prevent confused clients from using their hands or fingers to scratch and injure themselves. For example, a confused client may need to be prevented from pulling at intravenous tubing or a head bandage following brain surgery. Hand or mitt restraints allow the client to be ambulatory and/or to move the arm freely rather than be confined to a bed or a chair. Mittens need to be removed on a regular basis to permit the client to wash and exercise the hands. The nurse also needs to take off the mitten to check the circulation to the hand.



### Restraints: Wrist/Ankle

- Pull the tie of the restraint through the slit in the wrist portion or through the buckle.
- Using a half-bow knot (quick-release knot – see slide 32), attach the other end of the restraint to the movable portion of the bed frame.



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Read Slide

#### Instructor Notes

Pad bony prominences as necessary to prevent skin breakdown.  
If the ties are attached to the **immovable** portion of the bed frame, the wrist or ankle will not be pulled when the bed position is changed.

### Restraints: Wrist/Ankle

- Extremity restraint: designed to immobilize one or all extremities.
- Commercially available limb restraints composed of sheepskin or foam padding.
- Wrap limb restraint around wrist or ankle with soft part toward skin and secured snugly in place by Velcro straps.



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Read Slide

#### Instructor Notes

Ensure that a finger can be inserted between the restraint and the wrist or ankle.

### Restraints: Body Restraints (Not Commonly Used in Med/Surg)

- Belt or safety strap body restraints are used to ensure safety of all clients who are being moved on stretchers or in wheelchairs.
- Some wheelchairs have a soft, padded safety bar that attaches to side brackets that are installed under arm rests.



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Read Slide

#### Instructor Notes

To prevent the patient from slumping forward, attach a shoulder “Y” strap to the bar and over the patient’s shoulders to the rear handles. Other models have a three-loop design. One loop surrounds the waist and attaches to the rear handles. If such restraints are unavailable, place a folded towel or small sheet around the waist and fasten it at the back of the wheelchair. Belt restraints can be used for some patients confined to bed or to chairs. If the belt is attached to a stretcher, secure the belt firmly over the patient’s hips or abdomen. Belt restraints must be applied to all patients on stretchers even when the side rails are up (check individual hospital policy).

### Restraints: Jacket (Not Commonly Used in Med/Surg)

- Jacket Restraint: vest is placed on patient with the opening at front or the back depending on type.
- Pull the tie on end of vest flap across the chest, and place it through slit in the opposite side of the chest. Repeat with other tie.
- Use a half-bow to secure each tie. (next slide)



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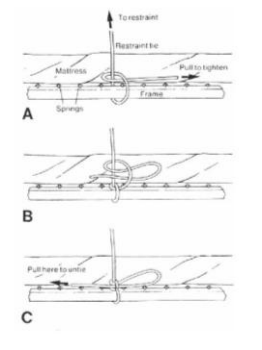
Read Slide

#### Instructor Notes

Some of these restraints are not commonly used in medical/surgical areas; however, it is still important to know about them and understand how to use them if the situation presents itself. This might be the case on a rehab unit.

## The Half Bow Knot

- Tie restraint with a knot is not likely to come loose, yet can be released easily by the nurse in an emergency. A half-bow knot meets these criteria.
- Explain to the patient the reason for the restraint.
- Ensure that a finger can be inserted between the restraint and the wrist or ankle.



The diagram illustrates the steps to tie a Half Bow Knot (Quick Release Knot) on a bed frame. It shows a side view of a bed with a mattress, springs, and a frame. A restraint tie is attached to the frame. The steps are labeled A, B, and C. Step A shows the free end of the tie being brought up around, under, and over the attached end of the tie, with an arrow pointing to 'Pull to tighten'. Step B shows the free end being taken over and under the attached end of the tie, with an arrow pointing to 'Pull here to untie'. Step C shows the final tightened knot, with an arrow pointing to 'Pull here to untie'.

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Read Slide

### Instructor Notes

To make a half-bow knot (quick release knot), first place the restraint tie under the side frame of the bed (or around a chair leg as shown). A. Bring the free end up around, under, and over the attached end of the tie and pull it tight. B. Again take the free end over and under the attached end of the tie, but this time make a half-bow loop. C. Tighten the free end of the tie and the bow until the knot is secure. To untie the knot, pull the end of the tie and then loosen the first cross over the tie.

## Restraint Management

- Determine reason for restraint/seclusion.
- Document what alternatives to restraint were considered and why not appropriate.
- Select appropriate restraint and apply according to instructions.
- Notify physician immediately.
- Inform family/SO/guardian/Durable Power of Attorney (DPOA).

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There are very definite standards for restraint management. Hospital policies may vary. Read Slide

## Slide 34

### Restraint Management (continued)

- Obtain orders with appropriate time frames:
  - No PRN or Standing Orders
  - Use preprinted orders on medical/surgical units ("Restraint/Seclusion Physician Order Sheet")
  - No physician order required for patients in law enforcement custody.

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## Read Slide

Slide 35

## Restraint Management (continued)

- Document what alternatives to restraint were considered and why not appropriate.
- Select appropriate restraint and apply according to instructions.
- Assess medical/surgical patients every 2 hours at a minimum.
- Assess patients in law enforcement custody every 2 hours.

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Read Slide



Slide 36

## Restraint Management (continued)

- Reposition and perform ROM of extremities every 2 hours (1 extremity at a time).
- Assist patient with all activities of daily living.
- Keep call light/device within reach at all times.
- Seek assistance of additional staff as necessary.

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Read Slide

## Post-Application Assessment

- Adjust frequency of nursing (RN) assessments as condition of patient warrants.
- Discontinue restraint as soon as possible regardless of time specified in order (qualified RN, physician, or LIP).

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Use critical thinking skills to decide the frequency of assessments and when to discontinue the restraint. Must discontinue restraints as soon as possible.

### Legal and Ethical Considerations

- Use of restraints has legal implications:
  - Restrict an individual's freedom and autonomy
  - Could be considered demeaning and psychologically harmful.
- False imprisonment occurs when patients are made to wrongfully believe they cannot leave.
- Restraints are legal only if they are necessary to protect the patient or others from harm.
- A nurse could be charged with assault and battery.

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The use of physical or chemical restraints without legal justification could be seen as false imprisonment.

If a competent patient refuses to follow orders and nurse uses restraints, then the nurse could be charged with assault and battery or false imprisonment.

### Legal and Ethical Considerations (continued)

- Ethical considerations include respecting patient dignity, autonomy, patient rights, safety, and privacy.
- Each order for restraints:
  - must include the patient's medical condition
  - must be for a specific episode (not to exceed 24 hours)
  - must be time limited.

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Ethical Considerations are very important. Consider the patient's right to dignity, autonomy, and safety. The order for restraints must include the patient's condition, provide a specific episode, be dated, timed, and be time limited.

### Legal and Ethical Considerations (continued)

- All restraint orders must be reviewed daily.
- The RN determines:
  - The appropriateness of restraints
  - The specific restraint to be used
  - The effectiveness of the restraint selected
  - Potential complications.
- Application and temporary removal for care can be delegated to those trained to do so (only hospital personnel).

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Restraint orders must be reviewed daily. It is the RN who determines the appropriateness of restraints, the restraint to be used, effectiveness, and potential complications. Delegation is an important consideration. Application and temporary removal for care can only be delegated to hospital personnel who have been trained.

### Legal and Ethical Considerations (continued)

- Report to treating physician immediately:
  - Extremity, cardio/respiratory, and emotional complications
  - Ineffectiveness of restraints.
- Report any serious patient injury or death while in restraints immediately to the Department Director and Senior Hospital Administration.

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Communication of any complications and the ineffectiveness of restraints to the primary physician is required. Report any serious patient injury or death while in restraints immediately to your supervisor.

### Legal and Ethical Considerations (continued)

- Department Director will make mandatory report to CMS.
- If a restraint episode is longer than 12 hours or if there are two or more episodes within 12 hours, the charge nurse is to be notified.

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Patient deaths in restraints must be reported to CMS whenever a patient dies while in restraints and also if the patient dies within a week of being in restraints if it is suspected that restraint episode may have contributed to death. The Charge nurse or acting charge nurse will be notified.

### Legal and Ethical Considerations (continued)

- The use of restraint is not based on the patient's restraint history or solely on a history of dangerous behavior.
- Restraints are not to be used as means of coercion, discipline, convenience, or staff retaliation.

#### Instructor Notes

Although restraints are not to be used for staff convenience, a 2009 study by Turgay, Sari, Gene reported that in 23.2% of the nurses in ICU studied, they reported that their rationale for applying restraints was for nurse convenience



## Restraint Management Documentation

- Documentation should include the following:
  - Relevant orders including time limits
  - Alternatives or other less restrictive interventions attempted
  - The rationale for restraints and continued use
  - The rationale for type of restraint used
  - Behavior/Mental Status of the patient
  - Response to restraint
  - Readiness for release from restraint
  - Name, credentials, title of those involved in patient assessments.

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Documentation is critical. Governing agencies will review charts to evaluate compliance. Documentation should include the following. Read Slide

### Restraint Management Documentation (continued)

- Record monitoring information on the **Restraint and Seclusion Monitor Flow sheet**.
- Record monitoring formation of patients in law enforcement custody on 24-hour Patient Observation Flow Sheet.
- Update the patient's Plan of Care regularly.
- Identify patients in restraints/seclusion to facilitate evacuation.

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The patient's care plan must be updated regularly and those patients in restraints/seclusion must be easily identified so as to facilitate evacuation if necessary.

## Adverse Outcomes of Restraint Use

- Adverse outcomes associated with the use of restraints include the complications of immobility, emotional devastation, serious injuries, and death.
- 1990 Study: Restraints were used in 24.3% of patients in intensive care units (ICU) and 3.4% of patients in adult non-ICUs. Current estimates are higher.

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There are many adverse outcomes associated with the use of restraints such as immobility, emotional devastation, injuries and death. The use of restraints can cause skin breakdown, bruising, edema and redness. The literature reports cases of thrombosis, muscular atrophy, and in the ICU, increased disorientation. The use of restraints is often higher in the ICU. This report of restraint use in ICU's is considered conservative.

## Slide 47

### Adverse Outcomes of Restraint Use

- Between 1995 and 2002, the Joint Commission received reports of seven deaths or injuries related to bed rails. Five cases involved patients 65 years of age or older and resulted in death by asphyxiation.
- 1993 Study: The greatest number of deaths occurred in the 80-89-year-old patients with higher incidence in females; more chair and bed related deaths involved the use of vest restraints; and the vast majority of deaths occurred while restraints were correctly applied (implies the inherent danger of deaths).

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## Read Slide

## Slide 48

### Adverse Outcomes (continued)

- Patient characteristics associated with restraint use were: Advanced age, disruptive behaviors, the presence of invasive devices, and cognitive impairment.
- Patient deaths were associated with patients being suspended from beds or chairs by straps or vest restraints, entrapped in side rails, and asphyxiation.

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## Read Slide

## Slide 49

### Summary

- Restraint of patients may be necessary to assure safety to self and/or others.
- All other possible options must be considered before using restraints.
- Consider carefully the type of restraint and choose the least restrictive restraint possible.
- Remain current on laws, regulations, and organizational policies and procedures which govern restraint use.

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## Read Slide

### Literature Review

- A review of the literature revealed that there continues to be no national benchmark data on restraint usage in the critical care area.
- Nationally 56% of the restraint usage is found in the ICU (Minnick, Mion, Johnson, Catrambone, & Leipzig, 2007).
- The majority of intubated/mechanically ventilated patients are restrained (Hofo, & Coyer, 2007).

Please note the review of the literature.

### Literature Review (continued)

- The majority of restraint usage is initiated by nursing staff, not physicians, because they are blamed for the loss of a line or an endotracheal tube (ETT) (Hine, 2007).
- The use of restraints does not reduce the rate of patient self extubation (Hofso, Coyer, 2007).
- More nursing education equals reduced use of restraints (Yeh, Hsiao, Chiang, Lin, Hsu, & Lin, 2004).



Slide 52

Thank you for completing this  
program.

Please complete the Post Test  
before you leave.

Read Slide

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The Joint Commission. (2010) NPSG Chapter Outline and Overview Hospitals. Retrieved September 1, 2010 from <http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/>



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- Yeh, S. H., Hsiao, C. Y., Chiang, M. C., Lin, L. W., Hsu, C. Y., & Lin, S. Y. (2004). The effects of continuing education in restraint reduction on novice nurses in intensive care units. *Journal of Nursing Research, 12*, 246-255. Retrieved August 21, 2010 from Academic Premier database.

Slide 61

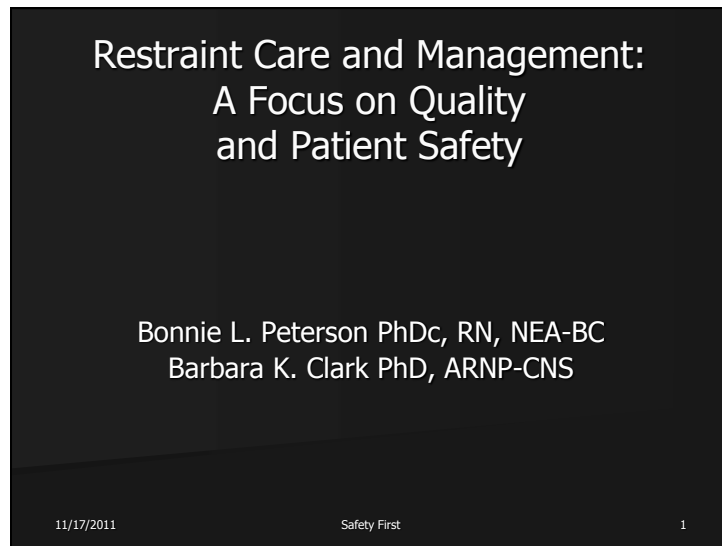


**Post- Test**

## Appendix H

### Didactic Lecture Script for Hospital B

Slide 1



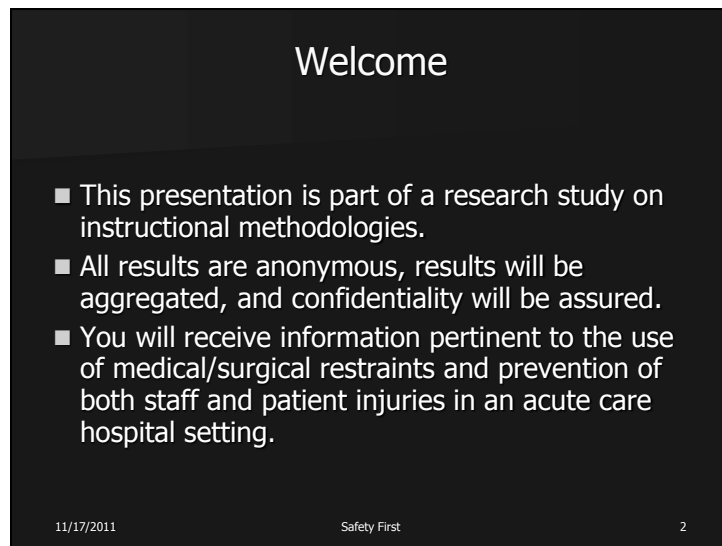
Greetings. Thank you for participating in this training session. You have been randomly selected to this experimental group of subjects. Other subjects are experiencing a different instructional methodology of the same content.

Please be sure to sign your name on the participant list in order to receive your **Certificate of Participation**. In no way will your name be linked to the results of the study. All individual results are strictly confidential.

There are two documents that you need to complete to participate in the study: **The Consent to Participate** in the Study, which you all should have already signed, and the **Demographic Survey** at your seat. Please take a moment now to complete the Demographic Survey so we have some important information about the subjects in the study. This information will be aggregated and, again, will not be connected to any particular participant.

Once you have completed the survey, please raise your hand and I will collect it. **Remember: Please complete the Post Test before you leave.** Refreshments are available in the next classroom. I hope you enjoy this experience. Your Certificates will be sent to you soon. Thank you!

## Slide 2



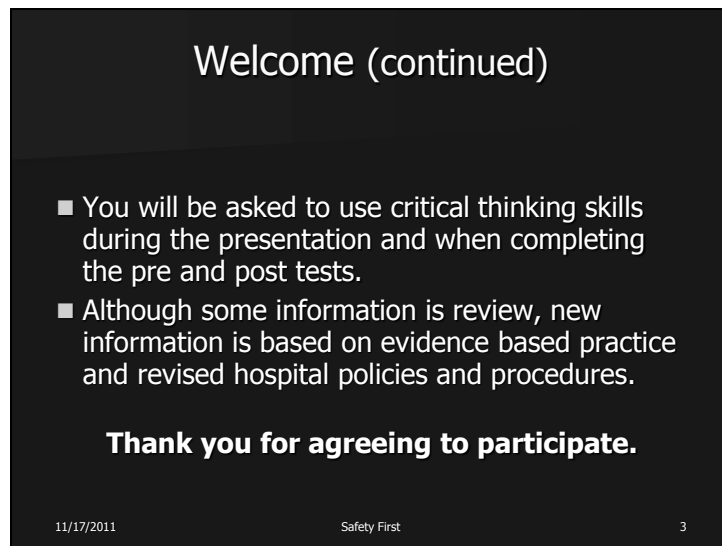
Welcome

- This presentation is part of a research study on instructional methodologies.
- All results are anonymous, results will be aggregated, and confidentiality will be assured.
- You will receive information pertinent to the use of medical/surgical restraints and prevention of both staff and patient injuries in an acute care hospital setting.

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Read Slide

### Slide 3



Welcome (continued)

- You will be asked to use critical thinking skills during the presentation and when completing the pre and post tests.
- Although some information is review, new information is based on evidence based practice and revised hospital policies and procedures.

**Thank you for agreeing to participate.**

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### Read Slide

Slide 4



Slide 5

Introduction

Nurses are the leaders in creating the  
culture of safety in the acute care  
setting.

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Read Slide

Slide 6

Overview of quality  
and safe patient care

The American Nurses Association  
Standards of Practice (ANA, 2004)  
set the expectation that registered nurses  
employ strategies to maintain patient  
safety.

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Read Slide



## Slide 7

Overview of quality and safe patient care (continued)

- In 2001 the IOM published "Crossing the Quality Chasm" which provided guidelines for care delivery redesign. Six aims were cited which must be addressed through process and quality improvements:
  - Timely
  - Effective
  - Efficient
  - Patient-Centered
  - Safe
  - Equitable

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Read Slide

Overview of quality and safe patient care (continued)

- The Institute of Medicine (IOM) described the nation's healthcare system as **fractured, prone to errors, and detrimental to safe patient care** (IOM, 2000).
- The **#1** recommendation for reducing risks to patient safety according to the Federal Drug Administration is **ORIENTATION AND TRAINING FOR STAFF!!!**

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#### Instructor Notes

Orientation and Training for staff is often not enough if staff do not change their practice as a result of evidence. Most of the time we tend to continue doing what we have always done.

### Critical Thinking for Patient Safety

- Safe patient care is based on the nurse's critical thinking skills and must include:
  - Knowledge from nursing and other scientific disciplines
  - Assessments of patient and family
  - Previous experiences in caring for patients and families
  - Attitudes and values such as perseverance, beneficence and autonomy
  - Standards of practice and policies (organizational, CMS, TJC, and AJN).

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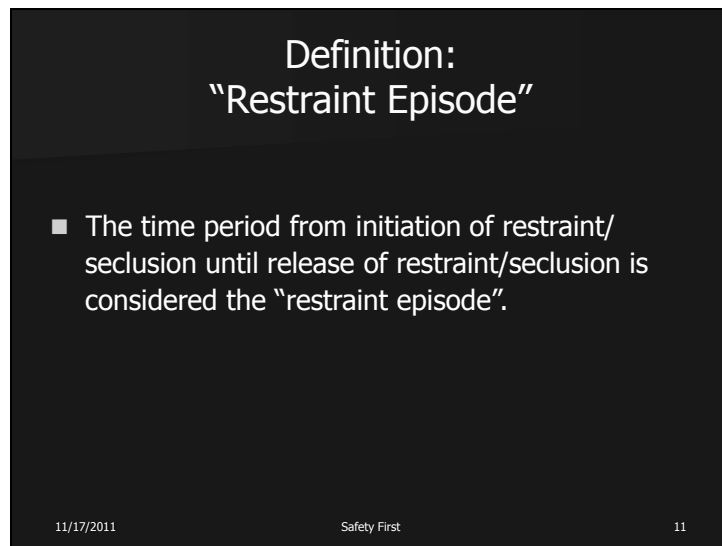
In order to be a safe practitioner, the skills of critical thinking must include the KNOWLEDGE of nursing and other scientific disciplines, assessments, previous experiences, ethical principles, and standards of practice and policies.

### Patient Safety and Critical Thinking (continued)

- Clinical judgments require nurses to:
  - Anticipate necessary information
  - Analyze the data
  - Make decisions regarding care.
- Critical Thinking is ongoing.
- Learning goal: apply critical thinking to the issue of safety and patient restraints.

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Clinical judgments require nurses to anticipate necessary information, analyze the data and make decision regarding care. Critical thinking is a life long process. The learning goal of this session is to apply knowledge and critical thinking skills to the safe use of patient restraints. That means becoming **COMPETENT** in the use of restraints.



Definition:  
"Restraint Episode"

- The time period from initiation of restraint/seclusion until release of restraint/seclusion is considered the "restraint episode".

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The definition of a "restraint episode is the time period from initiation of restraint/seclusion until the release of the restraint.

## Slide 12

Definition: "Restraint"

- Restraint is any manual method and/or physical or mechanical device, material, or equipment attached or adjacent to the patient's body that:
  - the patient cannot remove
  - restricts freedom of movement, physical activity, or normal access to one's body
  - voluntary or involuntary.

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## Read Slide

## Slide 13

Definition: "Restraint" (continued)

- Seclusion:
  - Confinement in a room or area where patient is physically prevented from leaving
  - Voluntary or involuntary
  - Used in an emergency to protect patient or others from harm
  - Used only when other less restrictive measures are ineffective.

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## Read Slide

Definition: "Restraint" (continued)

- Chemical Restraint:  
Medications, if used to restrict freedom of movement or control of behavior and not a usual part of patient's standard of care and treatment, are considered "restraints" (TJC, 2006).

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Definition: "Restraint" (continued)

- "Restraint" is **NOT**:
  - Orthopedically prescribed devices
  - Surgical dressings/bandages
  - Protective helmets
  - Holding for examinations/testing/activities to prevent harm
  - Use of 4 side rails when it is necessary to keep a patient safe (transport, seizure precautions, anesthesia recovery).

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Here are the exceptions to the restraint definition. Read Slide

## Use of Restraints

- Restraints present a specific challenge to patient care:
  - Rationale for use of restraints
  - Types of restraints and indication for use
  - Application of restraints
  - Staff Safety
  - Strategies for avoiding restraints
  - Legal issues
  - Ethical issues
  - Documentation

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The challenges that restraints present to patient care are having the right rationale for using restraints, selecting the right restraint, knowing how to apply restraints correctly, using safe body mechanics and having adequate help when applying restraints, and knowing the alternatives to restraints, the legal issues, ethical issues, and rules for documentation.

### Use of Restraints (continued)

- The Joint Commission provides safety standards for use of restraints and the role of nursing in safety management (2006).
- The Center for Medicaid and Medicare Services (CMS, 2006) published provisions on use of restraint and seclusion for all Medicare- and Medicaid-participating hospitals.

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The Joint Commission and the Center for Medicaid and Medicare Services have specific standards for the use of restraint and seclusion. Any complaints and violations are considered serious and follow up is closely monitored.

### Purpose of "Restraint"

- Goal: to directly support medical healing.
- Exceptions to Restraint Policy:
  - Patients restrained by corrections authorities for security purposes
  - Protective equipment such as helmets
  - Adaptive support in response to assessed physical needs of patients (postural support or orthopedic appliances)
  - Standard practices to conduct tests, procedures, and post-procedural care.

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The purpose of a restraint in medical/surgical areas is directed at the goal to directly support medical healing. The exceptions to the restraint policy are listed here: Read Slide

### Indications for Restraint

- Restraint/seclusion is indicated in the following situations:
  - Other less restrictive measures have been ineffective to protect the patient or others
  - Behavior in crisis becomes aggressive or violent and presents an immediate danger to self or others
  - Restraint is based on behavior and not restricted to certain departments
  - Use of restraint is not based on patient history alone.

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In the broad sense, restraint/seclusion is indicated in the situations listed.  
Read Slide

### Indications for Restraints (continued)

- Restraint/seclusion is indicated in the following situations: (continued)
  - The patient's healing process is threatened significantly or disrupted (restraints only)
  - Restraint standards apply when adaptive devices are used for both support and/or restraint only.

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Restraint/Seclusion **IS** indicated in the situations listed. Read Slide

### Pre-Application Assessments

- Upon ADMISSION consider possible threats to patient and staff safety, including immediate environment, and individual risk factors.
- Nursing History:
  - Level of wellness: any underlying conditions that pose threats to safety (gait, muscle strength, coordination, balance, vision)
  - Medications or procedures that pose threats (diuretics increase urinary frequency).

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The key here is the assessment upon admission. Consider any possible threat to patient and staff safety, including the immediate environment and individual risk. The Nursing Assessment includes any underlying condition that poses a threat to safety, such as those listed, medications, or procedures.

## Pre-Application Assessments (continued)

Risk for Falls:

- History of falls
- Fall assessment tool if appropriate
- Initial and daily fall risk assessment necessary
- Family consultation regarding history and fall risk factors.

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Many patients are determined a “fall risk” because of the history of falls. Use of a fall assessment tool and consultation with the patient’s family can determine to what degree the patient is at risk. The goal is to prevent falls!



## Pre-Application Assessments (continued)

- Patient and Family Expectations:
  - Understanding of risk factors
  - Understanding of safety measures such as restraints or seclusion
  - Willingness to cooperate and assist in restraint care and management.

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The cooperation and partnership with the patient and family can be a key factor in assuring the patient's safety. Expectations can vary so making sure there is a level of understanding of restraint care is critical. If families do not understand the risks, they can seriously compromise the patient's safety.

### Planning and Interventions: Seek Alternatives First

- Alternatives to Restraints:
  - Answer lights promptly
  - Close observation; move patient close to nurse's station
  - Attention to fall prevention at night and while walking with caregiver
  - Utilize modern equipment to eliminate falls (bed exit system, Ambularm, infrared technology, voice activated systems, and bed alarms)

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There are many alternatives to restraints that can reduce or eliminate the need for restraints such as those listed. Modifications of the environment as an alternative to using restraints are consistent with the trend toward health promotion, safety, and emphasis on improved assessment techniques. Read Slide

#### Instructor Notes

Modern equipment such as **Ambularm** on the leg is a good example. It signals when the leg is in a dependent position, such as over the side rail or on the floor. Other examples are the Bed-Check bed exit alarm system. This device sounds an audible alarm at the bedside when the body weight pressure is released off the sensor mat placed on patients' beds or chairs. Alarms can be designed to signal at the central nurses' station when patients get up or out of bed. Door alarms, Posey Bed All Care Model and side rails are viewed as less restrictive restraints. Some alarms are set with familiar voices such as a family member to "do not get out of bed, Dad."

**Planning and Interventions:  
Seek Alternatives First (continued)**

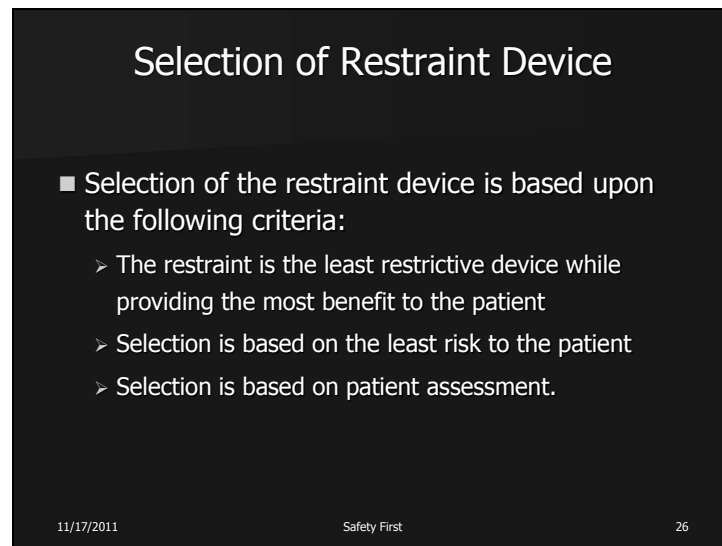
**Alternatives to Restraints ( continued)**

- Rubber-soled shoes or slippers
- Fixed night lights, bed height, location of bathroom, bathroom lighting, stable furniture and hand bars
- Family or others as sitters
- Remove excess furniture and equipment
- Physical activity (rocking chair).

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Here are some other alternatives some of which serve as distracters and/or help reduce anxiety. Nighttime is especially risky for falls. Read Slide

## Slide 26



The slide features a dark blue background with white text. At the top, the title "Selection of Restraint Device" is centered. Below it, a bulleted list outlines the criteria for selecting a restraint device. The footer contains the date "11/17/2011", the phrase "Safety First", and the slide number "26".

### Selection of Restraint Device

- Selection of the restraint device is based upon the following criteria:
  - The restraint is the least restrictive device while providing the most benefit to the patient
  - Selection is based on the least risk to the patient
  - Selection is based on patient assessment.

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## Read Slide

## Restraints: Mitten

- Mitten restraint:  
Thumbless mitten device to restrain client's hands.
- Place hand in mitten, being sure to bring end up over the wrist.



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Read Slide

### Instructor Notes

A mitt or hand restraint is used to prevent confused clients from using their hands or fingers to scratch and injure themselves. For example, a confused client may need to be prevented from pulling at intravenous tubing or a head bandage following brain surgery. Hand or mitt restraints allow the client to be ambulatory and/or to move the arm freely rather than be confined to a bed or a chair. Mittens need to be removed on a regular basis to permit the client to wash and exercise the hands. The nurse also needs to take off the mitten to check the circulation to the hand.

### Restraints: Wrist/Ankle

- Pull the tie of the restraint through the slit in the wrist portion or through the buckle.
- Using a half-bow knot (quick-release knot – see slide 32), attach the other end of the restraint to the movable portion of the bed frame.



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Read Slide

#### Instructor Notes

Pad bony prominences as necessary to prevent skin breakdown.

If the ties are attached to the **immovable** portion of the bed frame, the wrist or ankle will not be pulled when the bed position is changed.

### Restraints: Wrist/Ankle

- Extremity restraint: designed to immobilize one or all extremities.
- Commercially available limb restraints composed of sheepskin or foam padding.
- Wrap limb restraint around wrist or ankle with soft part toward skin and secured snugly in place by Velcro straps.



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Read Slide

#### Instructor Notes

Ensure that a finger can be inserted between the restraint and the wrist or ankle.

### Restraints: Body Restraints (Not Commonly Used in Med/Surg)

- Belt or safety strap body restraints are used to ensure safety of all clients who are being moved on stretchers or in wheelchairs.
- Some wheelchairs have a soft, padded safety bar that attaches to side brackets that are installed under arm rests.



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Read Slide


#### Instructor Notes

To prevent the patient from slumping forward, attach a shoulder “Y” strap to the bar and over the patient’s shoulders to the rear handles. Other models have a three-loop design. One loop surrounds the waist and attaches to the rear handles. If such restraints are unavailable, place a folded towel or small sheet around the waist and fasten it at the back of the wheelchair. Belt restraints can be used for some patients confined to bed or to chairs. If the belt is attached to a stretcher, secure the belt firmly over the patient’s hips or abdomen. Belt restraints must be applied to all patients on stretchers even when the side rails are up (check individual hospital policy).



### Restraints: Jacket (Not Commonly Used in Med/Surg)

- Jacket Restraint: vest is placed on patient with the opening at front or the back depending on type.
- Pull the tie on end of vest flap across the chest, and place it through slit in the opposite side of the chest. Repeat with other tie.
- Use a half-bow to secure each tie. (next slide)



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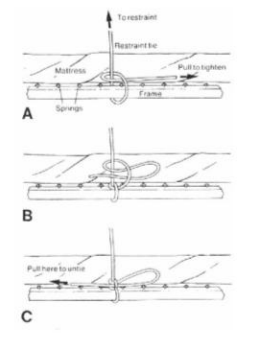
Read Slide

#### Instructor Notes

Some of these restraints are not commonly used in medical/surgical areas; however, it is still important to know about them and understand how to use them if the situation presents itself. This might be the case on a rehab unit.

## The Half Bow Knot

- Tie restraint with a knot is not likely to come loose, yet can be released easily by the nurse in an emergency. A half-bow knot meets these criteria.
- Explain to the patient the reason for the restraint.
- Ensure that a finger can be inserted between the restraint and the wrist or ankle.



The diagram illustrates the three steps to tie a half-bow knot on a restraint. Step A shows the restraint tied to a frame, with the free end brought up and around the attached end. Step B shows the free end being brought under and over the attached end to form a loop. Step C shows the free end being pulled tight to secure the knot. Labels include 'Forearm', 'Restraint', 'Pull to tighten', 'Frame', 'A', 'B', 'C', and 'Pull to untie'.

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Read Slide

### Instructor Notes

To make a half-bow knot (quick release knot), first place the restraint tie under the side frame of the bed (or around a chair leg as shown). A. Bring the free end up around, under, and over the attached end of the tie and pull it tight. B. Again take the free end over and under the attached end of the tie, but this time make a half-bow loop. C. Tighten the free end of the tie and the bow until the knot is secure. To untie the knot, pull the end of the tie and then loosen the first cross over the tie.

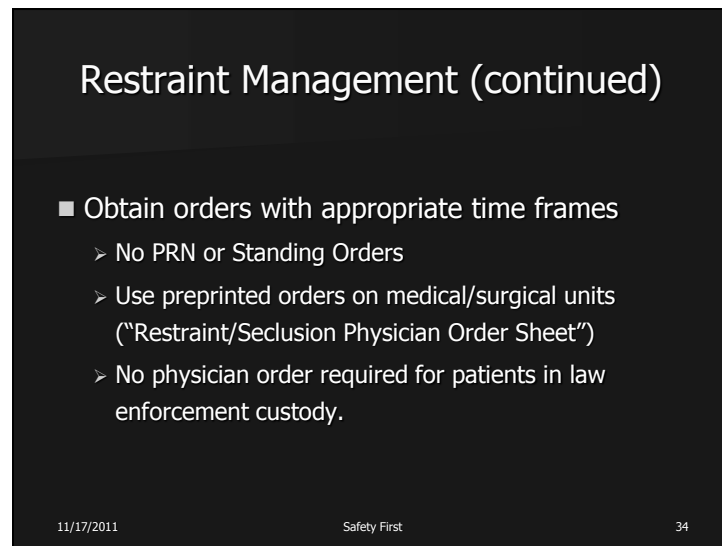
## Restraint Management

- Determine reason for restraint/seclusion.
- Supervisory review with RN prior to application (or within 15 min) ensures clinical justification & staffing.
- Notify physician immediately.
- Review medications with pharmacy or physician.
- Inform family/SO/guardian/Durable Power of Attorney (DPOA).

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There are very definite standards for restraint management. Hospital policies may vary. At [REDACTED] the policy states that the nurse first determines the reason for a restraint/seclusion and seeks a supervisory review.  
Read Slide

## Slide 34

A presentation slide with a dark blue background and white text. The title 'Restraint Management (continued)' is at the top. Below it is a bulleted list with three items. At the bottom, there is a footer with three small pieces of text: '11/17/2011', 'Safety First', and '34'.

### Restraint Management (continued)

- Obtain orders with appropriate time frames
  - No PRN or Standing Orders
  - Use preprinted orders on medical/surgical units ("Restraint/Seclusion Physician Order Sheet")
  - No physician order required for patients in law enforcement custody.

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## Read Slide

### Restraint Management (continued)

- Document what alternatives to restraint were considered and why not appropriate.
- Select appropriate restraint and apply according to instructions.
- Assess medical/surgical patients every 2 hours at a minimum.
- Assess patients in law enforcement custody every 2 hours.

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Assess patients in behavioral restraint and seclusion every 15 minutes or more.  
Read Slide

## Slide 36

### Restraint Management (continued)

- Reposition and perform ROM of extremities every 2 hours (1 extremity at a time).
- Assist patient with all activities of daily living.
- Keep call light/device within reach at all times.
- Seek assistance of additional staff as necessary.

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## Read Slide

## Post-Application Assessment

- Adjust frequency of nursing (RN) assessments as condition of patient warrants.
- Discontinue restraint as soon as possible regardless of time specified in order (qualified RN, physician, or LIP).

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Use critical thinking skills to decide the frequency of assessments and when to discontinue the restraint. Must discontinue restraints as soon as possible.

### Legal and Ethical Considerations

- Use of restraints has legal implications:
  - Restrict an individual's freedom and autonomy
  - Could be considered demeaning and psychologically harmful.
- False imprisonment occurs when patients are made to wrongfully believe they cannot leave.
- Restraints are legal only if they are necessary to protect the patient or others from harm.
- A nurse could be charged with assault and battery.

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The use of physical or chemical restraints without legal justification could be seen as false imprisonment.

If a competent patient refuses to follow orders and nurse uses restraints, then the nurse could be charged with assault and battery or false imprisonment. This is why the documentation is so important.



### Legal and Ethical Considerations (continued)

- Ethical Considerations include respecting patient dignity, autonomy, patient rights, safety, and privacy.
- Each order for restraints must include:
  - the patient's medical condition (clinical justification)
  - must be for a specific episode (not to exceed 24 hours)
  - and must be dated, timed, and time limited.

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Ethical Considerations are very important. Consider the patient's right to dignity, autonomy, and safety. The order for restraints must include the patient's condition, provide a specific episode, be dated, timed, and be time limited.

### Legal and Ethical Considerations (continued)

- All restraint orders must be reviewed daily.
- The RN determines:
  - Appropriateness of restraints
  - The specific restraint to be used
  - The effectiveness of the restraint selected
  - Potential complications.
- Application and temporary removal for care can be delegated to those trained to do so (only hospital personnel).

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Restraint orders must be reviewed daily. It is the RN who determines the appropriateness of restraints, the restraint to be used, effectiveness, and potential complications. Delegation is an important consideration. Application and temporary removal for care can only be delegated to hospital personnel who have been trained.

### Legal and Ethical Considerations (continued)

- Report to treating physician immediately:
  - Extremity, cardio/respiratory, and emotional complications
  - Ineffectiveness of restraints.
- Report any serious patient injury or death while in restraints (or death within 1 week of restraints) immediately to the Risk Manager or designee.

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Communication of any complications and the ineffectiveness of restraints to the primary physician is required. Report any serious patient injury or death while in restraints immediately to the Risk Manager or designee.

### Legal and Ethical Considerations (continued)

- The Risk Manager or designee will determine need to make mandatory report to CMS.
- If a restraint episode is longer than 12 hours or if there are two or more episodes within 12 hours, the charge nurse is to be notified.

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Patient deaths in restraints must be reported to CMS whenever a patient dies while in restraints and also if the patient dies within a week of being in restraints if it is suspected that restraint episode may have contributed to death. The Charge nurse or acting charge nurse will be notified.

### Legal and Ethical Considerations (continued)

- The use of restraint is not based on the patient's restraint history or solely on a history of dangerous behavior.
- Restraints are not to be used as means of coercion, discipline, convenience, or staff retaliation.

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#### Instructor Notes

Although restraints are not to be used for staff convenience, a 2009 study by Turgay, Sari, Gene reported that in 23.2% of the nurses in ICU studied, they reported that their rationale for applying restraints was for nurse convenience.

## Restraint Management Documentation

- Documentation should include the following:
  - Relevant orders including time limits
  - Alternatives or other less restrictive interventions attempted
  - The rationale for restraints and continued use
  - The rationale for type of restraint used
  - Behavior/Mental Status of the patient
  - Response to restraint
  - Readiness for release from restraint
  - Name, credentials, title of those involved in patient assessments.

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Documentation is critical. Governing agencies will review charts to evaluate compliance. Documentation should include the following. Read Slide

### Restraint Management Documentation (continued)

- Record monitoring information in nursing notes and on the appropriate restraint flow sheet.
- Record monitoring formation of patients in law enforcement custody on 24-hour Flow Sheet.
- Update the patient's Plan of Care regularly.
- Patients in restraints/seclusion are identified on daily staff assignment sheets to facilitate evacuation.

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Record monitoring information in the nursing notes and on the appropriate restraint flow sheet. The patient's care plan must be updated regularly and those patients in restraints/seclusion must be easily identified so as to facilitate evacuation if necessary.

### Adverse Outcomes of Restraint Use

- Adverse outcomes associated with the use of restraints include the complications of immobility, emotional devastation, serious injuries, and death.
- 1990 Study: Restraints were used in 24.3% of patients in intensive care units (ICU) and 3.4% of patients in adult non-ICUs. Current estimates are higher.

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There are many adverse outcomes associated with the use of restraints such as immobility, emotional devastation, injuries and death. The use of restraints can cause skin breakdown, bruising, edema and redness. The literature reports cases of thrombosis, muscular atrophy, and in the ICU, increased disorientation. The use of restraints is often higher in the ICU. This report of restraint use in ICU's is considered conservative.



## Slide 47

### Adverse Outcomes of Restraint Use

- Between 1995 and 2002, the Joint Commission received reports of seven deaths or injuries related to bed rails. Five cases involved patients 65 years of age or older and resulted in death by asphyxiation.
- 1993 Study: The greatest number of deaths occurred in the 80-89-year-old patients with higher incidence in females; more chair and bed related deaths involved the use of vest restraints; and the vast majority of deaths occurred while restraints were correctly applied (implies the inherent danger of deaths).

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Read Slide

## Slide 48

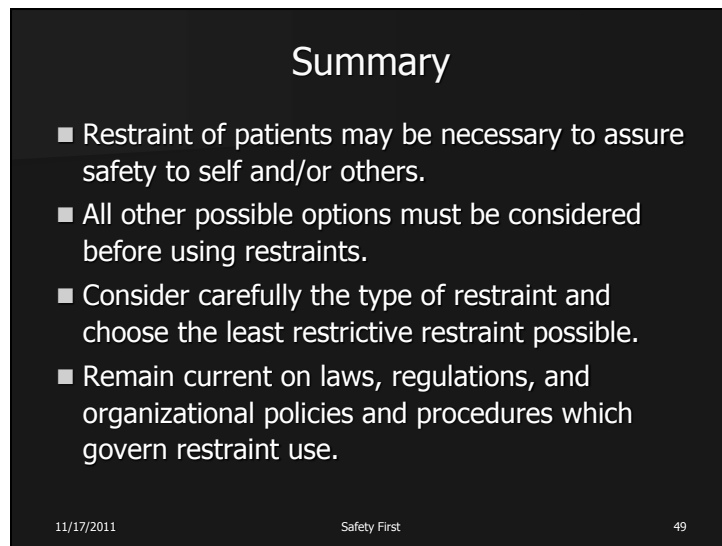
### Adverse Outcomes (continued)

- Patient characteristics associated with restraint use were: Advanced age, disruptive behaviors, the presence of invasive devices, and cognitive impairment.
- Patient deaths were associated with patients being suspended from beds or chairs by straps or vest restraints, entrapped in side rails, and asphyxiation.

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## Read Slide

## Slide 49



The slide is titled "Summary" and contains four bullet points. The background is dark with light-colored text. At the bottom, there is a footer with the date "11/17/2011", the text "Safety First", and the number "49".

### Summary

- Restraint of patients may be necessary to assure safety to self and/or others.
- All other possible options must be considered before using restraints.
- Consider carefully the type of restraint and choose the least restrictive restraint possible.
- Remain current on laws, regulations, and organizational policies and procedures which govern restraint use.

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## Read Slide

Slide 50

### Literature Review

- A review of the literature revealed that there continues to be no national benchmark data on restraint usage in the critical care area.
- Nationally 56% of the restraint usage is found in the ICU (Minnick, Mion, Johnson, Catrambone, & Leipzig, 2007).
- The majority of intubated/mechanically ventilated patients are restrained (Hofo, & Coyer, 2007).

Read Slide

### Literature Review (continued)

- The majority of restraint usage is initiated by nursing staff, not physicians, because they are blamed for the loss of a line or an endotracheal tube (ETT) (Hine, 2007).
- The use of restraints does not reduce the rate of patient self extubation (Hofso, Coyer, 2007).
- More nursing education equals reduced use of restraints (Yeh, Hsiao, Chiang, Lin, Hsu, & Lin, 2004).

Read Slide

Thank you for completing this  
program.

Please complete the Post Test  
before you leave.

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**Post- Test**

## Appendix I

### Script for Interactive Computer Sessions

#### **Script for Instructions**

#### **Computer Assisted Learning Module**

1. Greetings. Thank you for participating in this training session. You have been randomly selected to this experimental group of subjects. Other subjects will be experiencing a different instructional methodology.
2. Please be sure to sign your name on the participant list in order to receive your **Certificate of Participation**. In no way will your name be linked to the results of the study. All individual results are strictly confidential.
3. There are two documents that you need to complete to participate in the study: **The Consent to Participate** in the Study, which you all should have already signed, and the **Demographic Survey** at your seat. Please take a moment now to complete the Demographic Survey so we have some important information about the subjects in the study. This information will be aggregated and, again, will not be connected to any particular participant.

Once you have completed the survey, raise your hand so I can collect them.



4. You will have 1 hour to complete the entire program once you begin, including the Pretests and Posttests.
5. After some brief introductory information, you will be asked to **"Click to open Pretest"**. That will take you to the Pretest. Enlarge the screen.

Once you have indicated an answer to each question, be sure to click **"submit"**. That way your answers will be recorded.

6. Follow the directions to **"Close the Window to Proceed"**. You will see a screen that directs you to **"Click to continue"**...

7. Please follow these directions with each scenario and the "Post Test".

8. **Important!!** Once you have selected an answer to the scenario question, you will receive feedback as to whether your answer was correct and supporting rationale. **DO NOT** go back to select another answer.

Click **"Continue"** and **submit** your answer. Close the window as directed.

Finally, **"Click to continue"**.

- 9 Once you have completed the **Posttest**, you are free to leave. Please help yourself to the treats provided!!

10. Reminder. Please time yourself so you can finish within the 60 minutes.

11. Thank you so much for participating. You will receive your Certificate of Participation as soon as possible.

## Appendix J

### Computerized Patient Care Scenarios (6)

#### Scenario 1

Select the one best response for the scenario. After you have made your selection you will be able to see if you are correct

---

Scenario - Mrs Richards Mrs. Richards, age 88, has been brought to the hospital from a local nursing home because she fell and broke her right hip. She had hip replacement yesterday and the night shift tells you that she slept pretty well last night. This morning you go to her room for your first assessment of her and find her lying on the floor beside the bed groaning and trying to get up. What is your first action?

- ☐ Get help to put her back in bed
- ☐ Notify her physician of her fall
- ☐ Assess her for injuries
- ☐ Place a pillow under her head and make her comfortable where she fell until x-ray can come

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## Scenario 1

---

### **You are correct**

Before moving her or doing anything else, check for injury.

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## Scenario 1

---

### **You are incorrect**

You won't do this until you know the extent of her injuries

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## Scenario 1

---

**You are done.**

Please click the "Submit" button below to save your answer.

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## Scenario 2

Select the one best response for the scenario. After you have made your selection you will be able to see if you are correct.

---

Scenario - Mr. Lee Mr. Lee, age 30, was admitted yesterday with a closed head injury after a motorcycle injury. He has been confused since he regained consciousness. He continually attempts to get out of bed and leave the facility. Family members have been staying with him to ensure his safety but are unable to continue this. Neither the physician or the family will approve of a physical restraint as a safety measure. Which intervention will be most appropriate to Mr. Lee's safety?

- ☐ Give him short explanations prior to performing procedures
- ☐ Place family pictures in his room
- ☐ Place him in a wheelchair with a removable lap tray
- ☐ Ask his physician to prescribe an anxiolytic medication

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## Scenario 2

---

### **You are incorrect**

Anxiolytics are chemical restraints and could increase his confusion and risk of injury

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## Scenario 2

---

### **You are correct**

The lap tray will provide support and keep Mr. Lee in place

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## Scenario 2

---

**You are done.**

Please click the "Submit" button below to save your answers.

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## Scenario 3

---

Mrs. Jones Mrs. Jones, age 65, was admitted to your medical unit last night. She had suddenly complained of dizziness at home and fell before her husband could reach her. She was unresponsive when EMS arrived but began to moan and thrash about in bed during the night. The night shift checked on her hourly. Her doctor has ordered a sedative for her if she becomes too restless. This morning she is once again trying to pull at her IVs and moaning. What should your FIRST nursing action be?

- ☐ Administer the sedative that the doctor ordered
- ☐ Have one of the nurse techs sit with her
- ☐ Call the physician for an order for wrist restraints
- ☐ Move her to a room close to the desk

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## Scenario 3

---

### **You are incorrect**

This is really not a practical solution, especially when it ties up one of your techs. If you think a sitter is necessary, a family member is a better choice

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## Scenario 3

---

### **You are correct**

This is the best to do first, although you may have to still do the others

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## Scenario 3

---

**You are done.**

Please click the "Submit" button below to save your answers.

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## Scenario 4

Select the one best response for the scenario. After you have made your selection you will be able to see if you are correct

---

Mr. Hanson Mr. Hanson, age 82, has had to be placed in a soft waist restraint because of continued confusion, agitation, and attempts to get out of bed. This morning he is more agitated and restless than usual. What action will you take FIRST?

- ☐ Contact the physician to see if continued restraint is necessary
- ☐ Check to see that the restraint is applied correctly
- ☐ Assess Mr. Hanson's mental and physical status
- ☐ Increase the frequency of your observation and assessment

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## Scenario 4

---

### No, this is not the FIRST thing

Assess him first. Then you can check for not only this, but for possible irritation on his skin from the device even if it is applied correctly

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## Scenario 4

---

### **You are correct**

You need to make every attempt to find out the cause of his increased agitation

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## Scenario 4

---

**You are done.**

Please click the "Submit" button below to save your answers.

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## Scenario 5

Select the one best response for the scenario. After you have made your selection you will be able to see if you are correct

---

Ms. Jacoby Ms. Jacoby, age 18, has just had a seizure. What action could you delegate to your nursing assistant?

- ☐ Document the seizure
- ☐ Perform neurological checks
- ☐ Take Ms. Jacoby's vital signs
- ☐ Tell her to provide a soft restraint for Ms. Jacoby's safety

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## Scenario 5

---

### **This is not correct**

This is your responsibility - you are the one who has been educated to do these and make interpretations about your results.

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## Scenario 5

---

### **This is correct**

Your assistant can check Ms. Jacoby's vital signs

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## Scenario 5

---

**You are done.**

Please click the "Submit" button below to save your answers.

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## Scenario 6

Select the one best response for the scenario. After you have made your selection you will be able to see if you are correct

---

Mrs. Grant You are receiving a report from a relatively new night shift nurse. She tells you that Mrs. Grant, age 92, with dementia was confused during the evening and kept getting out of bed. Because of this, a PRN sedative was administered and a temporary chest restraint was placed to prevent falls. What is your priority action?

- ☐ Report the nurse to your supervisor for violating Mrs. Grant's rights
- ☐ Assess Mrs. Grant and obtain additional information about the incident
- ☐ Advise the nurse to contact the physician to explain what had happened
- ☐ Remove the restraint and tell the nurse not to use sedatives with dementia patients

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## Scenario 6

---

### **This is not your priority**

It may have to be done later if Mrs. Grant's rights were actually violated according to hospital protocol.

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## Scenario 6

---

### Correct

You really cannot act intelligently without assessing for as many facts as possible about a situation

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## Scenario 6

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